Economic Behaviour During Conflict:

Education and Labour Market Participation in Internally Displaced People's Camps in Northern Uganda

by

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Abstract

This dissertation investigates men and women's labour force participation and children's education outcomes using original data collected in Ugandan Internally Displaced People's (IDP) camps in 2005 and 2007. The random nature of the conflict and mass displacement in the region is exploited to identify their impacts on behaviour. Furthermore, a randomized trial of two alternative food for education programs implemented in the IDP camps is evaluated. The impacts of the programs on primary school participation, cognitive development, and learning achievement are investigated.

The first chapter introduces the dissertation and explores the research setting by detailing the randomized school feeding experiment and the data collection process. It considers the context in which the data was collected, focusing on the conflict in the region at the time.

The second chapter uses this unique data set and the exogenous nature of the conflict and resulting displacement in Northern Uganda to examine their impacts on labour market participation. I find that the longer the existence of the camp to which people moved, the less men work. In contrast, women's labour market decisions are not influenced by the age of the Internally Displaced People's camp in which they live. I argue that these responses result from the development of gender-specific social norms regarding idleness and not from a lack of opportunities. A decline in the percentage of men working in a camp leads to a reduction in the probability that a given man works.

The third and fourth chapters provide solid empirical evidence of the educational impacts of two food for education programs. Joint with my co-

authors, I compare education outcomes between three randomly assigned groups: Beneficiaries of an in-school meals program, beneficiaries of a take-home rations program providing equivalent food transfers conditional on school attendance, and a control group. The findings suggest that, in general, both programs performed equally well in improving school participation. While access to both programs improved cognition, the impacts on learning achievement are not as strong.

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Statement of Co-Authorship

I hereby declare that this thesis incorporates material that is the result of joint research undertaken in collaboration with Harold Alderman, Sarah Adelman, and Daniel O. Gilligan. The collaboration covers sections 1.4 and 1.5 and chapters 3 and 4 of the thesis. Sections 1.4 and 1.5 provide information previously stated in "An Evaluation of Alternative School-Based Feeding Programs in Northern Uganda: Report on the Baseline Survey" by Daniel Gilligan, Sarah Adelman, and Kim Lehrer (2006). Chapter 3 is co-authored with Harold Alderman and Daniel O. Gilligan. Chapter 4 is co-authored with Sarah Adelman, Harold Alderman, and Daniel O. Gilligan.

The data analyzed in this dissertation was collected in order to evaluate two alternative food for education (FFE) programs in Northern Uganda. The World Food Programme and the World Bank jointly decided to conduct and fund three FFE evaluations: One in Uganda, one in Burkina Faso, and one in Laos. The International Food Policy Research Institute (IFPRI) was hired to evaluate the random expansion of the FFE programs into Northern Uganda. The evaluation was lead by Daniel O. Gilligan at IFPRI and overseen by Harold Alderman at the World Bank. Along with Sarah Adelman, who, at the time, was a graduate student at the University of Maryland, I collaborated on the Ugandan evaluation. My contribution to this research began with the design of the evaluation in 2005.

The design of the Ugandan evaluation was jointly conducted by Daniel O. Gilligan, officials from the World Food Programme in Uganda, Sarah Adelman, and myself. Daniel O. Gilligan oversaw the sample selection while the World Food Programme implemented the FFE programs. Sarah Adelman, Daniel O. Gilligan, and myself created the survey instruments and designed the fieldwork schedule. Sarah Adelman and myself oversaw the data col-

lection, and in addition, I oversaw the data entry. Sarah Adelman, Daniel O. Gilligan, and myself cleaned the data and performed the data analysis. I performed the data analysis regarding the impacts of the FFE programs on school participation, cognitive development, and learning achievement, with assistance from Sarah Adelman (regarding cognitive development and learning achievement) and from Daniel O. Gilligan (regarding all of the education outcomes). I was one of the main authors of chapters 3 and 4 of this dissertation along with Daniel O. Gilligan (regarding chapters 3 and 4) and Sarah Adelman (regarding chapter 4).

The research idea, data analysis, and manuscript preparation of chapter 2 of this dissertation was initiated and conducted by me alone.

Chapter 1

Introduction

1.1 Motivation

War and conflict are all too common phenomena with serious consequences. One of these consequences is displacement. Conflicts often cause both temporary and permanent mass displacement. The economics literature has contributed little to the understanding of these consequences, especially at the individual level. Furthermore, many non-governmental organizations and governments provide aid in conflict and displacement situations but solid empirical evidence of the effectiveness of this aid is lacking. This dissertation contributes to the understanding of the consequences of conflict and displacement at the individual level by examining their impacts on labour market participation. It also evaluates two food for education programs provided by the World Food Programme that are often implemented in such settings. This is accomplished by analyzing a new household level data set I was involved in collecting in Northern Uganda in 2005 and 2007 during a time of conflict and displacement.

1.2 The Research Setting

This dissertation studies behaviour during conflict and displacement in Northern Uganda in 2005 and 2007. Northern Uganda has been the site of a rebel group insurgency that forced the rural population into Internally Displaced People's camps. The data analyzed in this dissertation was collected in Internally Displaced People's camps in two districts, Lira and Pader, in Northern Uganda. The rebel group's tactics and lack of agenda lead to random attacks of the Northern population. In 2007, the Government of

Uganda and the rebel group entered into peace talks and by the time of the resurvey, many households had left the Internally Displaced People's camps and moved home.

The data used for the research described in this dissertation was collected as an evaluation of two alternative food for education programs in Northern Uganda. The data was collected by the International Food Policy Research Institute (IFPRI) with assistance from Makerere University School of Public Health in Kampala, Uganda and its collection was overseen by myself and Sarah Adelman. The evaluation was one of three commissioned by the United Nations World Food Programme (WFP) and the World Bank to compare the impacts of two alternative food for education delivery methods: In-school meals (SFP) and take-home rations (THR). The data was collected in two rounds; the first prior to the implementation of the programs from October-December 2005 and a resurvey from March-April 2007. During this time period, Northern Uganda was the site of a rebel group insurgency that forced the displacement of the rural population into camps. The sample was drawn from displaced households in two districts in Northern Uganda.

The World Food Programme provided aid to all Internally Displaced People's camps in Pader and Lira districts in 2005 and 2007. Their primary aid took the form of general food aid. As the majority of households had been rural farmers prior to displacement and many were, once displaced, no longer able to farm, the World Food Programme provided 50-75 percent of households' food requirements. In addition to these general food rations, the World Food Programme agreed to randomize the expansion of their food for education programs into the Internally Displaced People's camps in these two districts. The World Food Programme generally provides in-school meals to children in emergency situations. In Northern Uganda, this consisted of a fortified mid-morning snack and lunch. In addition to this traditional in-school meals program, the World Food Programme wanted to evaluate an alternative food for education program; a take-home rations program providing equivalent food transfers as dry rations once a month conditional on a minimum level of school attendance. This dissertation compares the impacts of both programs on education outcomes.

The rest of the chapter is organized as follows. The following section describes the conflict in Northern Uganda and summarizes its impact on the local population, including the displacement into Internally Displaced People's camps. Section 1.4 describes the randomization of the food for education programs and provides a description of those programs. Section 1.5 describes the sampling strategy employed in determining both the geographic locations of analysis and the sample households. It also provides a summary of the data collection process and outlines the the survey instruments. Section 1.6 concludes this chapter and provides an overview of the remaining chapters of the dissertation.

1.3 Conflict and Displacement in Northern Uganda

Politically, Northern Uganda comprised 18 districts in 2005. Of these districts Gulu, Kitgum, and Pader in the Acholi region, Lira and Apac in the Lango region, and Kotido, Moroto, and Nakapiripirit in the Karamoja region have been most affected by the rebel group insurgency. The regions are depicted in Figure 1.1. This research focuses on the Acholi and Langi peoples of Lira and Pader districts. The Acholi and Langi speak almost identical languages and share many cultural characteristics. Prior to the conflict, they were traditionally rural farmers, living in villages on their own land with livestock.

The conflict in Northern Uganda arose from a division between the North and South of the country. When the current president, Yoweri Museveni, and his Southern-based army took power in 1986, Northerners were marginalized. The Lord's Resistance Army (LRA), a rebel group led by Joseph Kony, formed claiming to represent Northern grievances. The LRA received little public support from Northerners and has since terrorized the local population. Though initially claiming as its objective the overthrow of the Southern-based government and the ruling of Uganda by the biblical Ten Commandments, the LRA lacks a clearly articulated political agenda.

Figure 1.1: Map of Uganda

Its stated aim became to purify the Northern population through violence; declaring that civilians needed to be punished for accepting the government's rule. The LRA also has a spiritual component. Kony is a self-proclaimed prophet who claims that God instructs his actions.

The LRA has tortured, raped, murdered, mutilated, and abducted the Northern population. Children and youth are abducted and forced to become soldiers, labourers, porters, and child brides. Some are taken for years; others for a few hours or days. Some are allowed to leave; some escape; while others are captured by the Ugandan People's Defence Force (UPDF), the Ugandan military, and eventually freed.

In response to the insecurity in the North over 80 percent of the population moved, either voluntarily or forcibly, to Internally Displaced People's camps. Due to the threat of attack, camp residents were confined to the camp boundaries; leaving the majority of the population without access to their ancestral homes and land. Security zones were created as perimeters around each IDP camp restricting the movements of camp residents from the camp in which they lived. This left most households dependent on food aid for survival. The United Nations World Food Programme provided food rations to all camp residents.

Referred to by the Ugandan government as 'protective camps' many have experienced frequent rebel attacks. Camp residents have also been victims of abuses by soldiers. Most camps were established around pre-existing villages or trading centers near military detaches. The process of camp formation is discussed further in chapter 2. All camps have an organizational structure which divides the camp into different blocks. IDP camps have been described as "sites of semi-urbanization of rural life." (Bøäs and Hatløy, 2005, p.11). Conditions in IDP camps are poor and camps lack adequate sanitation and water. They also have extremely high population densities. IDP camps are characterized by a high incidence of malnutrition, high mortality rates, low life expectancies, high primary school dropout rates, and early pregnancies and marriages.

Primary school in Uganda consists of grades 1 through 7, with pre-school being extremely rare, especially in rural Uganda. In 2002, Uganda adopted

Universal Primary Education (UPE)[1] which, in theory, abolished all primary school fees. In practice, some schools do require additional payments from pupils for such things as parent-teacher association fees, textbooks, and uniforms. Primary education is present in IDP camps through learning centers; agglomerations of pupils and staff from schools displaced from their villages. In some instances, the classes of the original schools are preserved within the learning center, while in others, pupils from different displaced schools are intermingled in classes. In 2005, all IDP camps in this study contained at least one primary school, with some camps containing more than one learning center. Nearly all pupils in a learning center reside in that same camp.

The quality of education in the learning centers in IDP camps is poor. They often lack sufficient infrastructure and schooling inputs, such as textbooks and other learning materials. Classrooms are often shared between more than one class. Learning centers are overcrowded with the lower classes much more crowded than the upper ones. Teacher absence is a serious problem and learning centers often have difficulty finding qualified teachers who are willing to teach in an IDP camp. In Uganda, a primary school leaving examination (PLE) is written at the end of primary school, grade 7. The PLE is a national exam and pupils are required to pass the exam in order to be able to continue on to secondary school. Secondary education in Northern Uganda is much less prevalent with very few camps containing a secondary school.

Peace talks between the Government of Uganda and the LRA officially began in July 2006 leading to relative security in the region and to resettlement. Camps were disbanded and families were encouraged to return home. The government decided to close all but one IDP camp in Lira and by March 2007, most households had returned home. In Pader, households moved to smaller, less populated resettlement camps located closer to their homes. These new camps were a step toward the complete return home and allowed many households daily access to their land.

[1] Uganda first adopted UPE in 1996 but for a maximum of four children per family. In 2002, it was extended to all children of primary school age.

1.4 The Food for Education Experiment[2]

1.4.1 Randomization

The study sample was drawn from households living in IDP camps in Pader and Lira districts in Northern Uganda. These districts were selected because they were the World Food Programme's desired locations for the expansion of school feeding in Uganda. The programs were introduced only in IDP camps because living conditions were generally considered to be worse inside the camps than in towns[3]. Also, WFP already had a presence in the IDP camps because of their provision of general food rations to the camps.

The evaluation of the food for education programs uses a prospective randomized design. This was implemented by randomly assigning the three interventions (in-school meals, take-home rations, and control) to IDP camps. The randomization of the programs was conducted at the IDP camp level, which serve as the catchment area for primary schools. The IDP camps for the study were selected based on the World Food Programme's budget for the implementation of the food for education programs and based on their prioritization of camps.

The World Food Programme's budget permitted 47,000 pupils in Pader district and 27,000 pupils in Lira district to receive either the in-school meals program or the take-home rations program. According to recent learning center enrollment data (May 2005 for Lira and 2004 for Pader), the World Food Programme allocated 63.5 percent of their program budget to Pader district, which comprised 56.6 percent of the pupils in both districts. WFP prioritized Pader district because of its relative insecurity. Camps in each district were ranked based on priority; those in Pader based on remoteness and accessibility to income generating activities and in Lira based on conflict intensity. The total number of camps in each district selected for inclusion

[2]This section relies on (Gilligan et al., 2006, An Evaluation of Alternative School-Based Feeding Programs in Northern Uganda: Report on the Baseline Survey.)

[3]Both Lira and Pader districts each have one large town that was not considered for the food for education experiment. All other towns in the district were actually IDP camps.

in the randomization process was based on this prioritization and recent enrollment data. IDP camps were selected until enrollment in the learning centers equaled the sum of the World Food Programme's pupil allowance and the number of pupils needed to form a control group. This process led to the selection of 31 IDP camps; 16 in Lira district and 15 in Pader district[4].

The learning centers in the sample were first stratified by district. They were then assigned to the treatment groups using block randomization. This entailed the selection of three learning centers at once and the random assignment of one learning center to each treatment within each group of three. In Lira district, learning centers were ordered based on priority, and further by county, and groups of three were sampled starting from those ranked as being of the highest priority. Learning centers in Pader district were ordered by priority and further by size. There are 13 IDP camps in the in-school meals group, and 9 each in the take-home rations and control groups. The camps are listed in table 1.1.

1.4.2 The Food for Education Programs

The two food for education programs evaluated in this thesis were managed and funded by the World Food Programme. The in-school meals program provides a free fortified mid-morning snack and lunch to all students enrolled in schools operating the program. The snack consists of a porridge made from micronutrient fortified corn-soya-blend (CSB), sugar, and water. The lunch consists mainly of beans and either hot posho (maize meal) or rice. The lunch also includes vegetable oil and salt. The combined meals provide approximately 1049 kcals of energy, 32.6 gm of protein, and 24.9 gm of fat. The daily transfer meets two thirds of a child's daily vitamin and mineral requirements, including 99 percent of iron requirements. Households with children in the program are required to contribute firewood for cooking and a fee of approximately US$0.10 per month toward the pay of the cooks.

[4]In 2005, there were 22 IDP camps in Lira district (excluding 16 camps in Lira Municipality; the urban camps) and 30 IDP camps in Pader district. In Lira, the IDP camps in the sample comprised 86% of the rural camp population and 66% in Pader.

Table 1.1: Sample IDP Camps by Treatment

SFP	THR	Control
PADER		
Adilang	Amyel	Lagute
Atanga Mission	Arum	Omiya Pacwa
Geregere	Kalongo	Pajule
Lira Palwo	Corner Kilak	Patongo
Puranga	Omot	
Wol		
LIRA		
Amugu	Abia	Aloi
Abako	Agweng	Apala
Barr	Alebtong	Aromo
Ogur	Adwari	Aliwang
Okwang		Lacekocot
Orum		
Alanyi		

The dry rations provided in the take-home rations (THR) program are equal in size and composition to the food received by in-school meals beneficiaries. This facilitates the comparison of the impacts of both methods of school feeding provision. The THR rations are provided to beneficiary households once per month. THR beneficiary households received a THR ration for each primary-school age child that was enrolled and attended school at least 85 percent of the days in the previous month.

As discussed in section 1.3, all camp residents in Pader and Lira districts received a general monthly food ration from WFP. In 2005, this ration was calculated to meet 50 percent of the food requirements of households in Lira district and 75 percent of those in Pader, based on the size of the household. These figures were selected on the presumption that households could independently meet their remaining food requirements. Therefore, the figures imply Pader district to be worse-off compared to Lira district, according to WFP. The general food rations were subsequently reduced by WFP in 2006 as the security situation in the region improved. The composition of

the general food rations and the take-home rations are similar. Therefore, the food provided by the interventions is an exact substitute for what is typically served in the home. This suggests that under both treatments, the FFE ration increased the amount of food available to the household, but not its composition.

The relocation of households, beginning in 2006, lead to some disruption of the SFP and THR programs, particularly in Lira district. The programs were restarted in most Pader resettlement camps after an interruption of only a few weeks, as the schools relocated to these new camps. In Lira district, the programs began again in relocated schools after an interruption of a couple of months on average.

1.5 Data Collection

1.5.1 Sample Selection

Preliminary estimates of statistical power indicated that a sample size of 30 households per camp was necessary to identify a 15 percentage point impact on primary school attendance[5]. The calculation was completed using data from the 1999 Uganda National Household Survey. The per camp sample size necessary to detect an effect size of 15 percentage points was estimated in order to provide an 80 percent chance, i.e. the power of the test, of rejecting the null hypothesis of zero change in the attendance rate as a result of receiving a treatment at the 0.05 level of significance. The calculation accounted for stratification at the district level and clustering at the camp level.

Household samples were selected from each camp using data from a June 2005 revalidation of IDP camp resident lists conducted by the World Food Programme in Lira district and by World Vision on behalf of WFP in Pader. Camp revalidations allow WFP to maintain current and accurate records of residency in each camp, for the purpose of general food distribution. These

[5] A target sample size of 40 households was actually selected in order to identify smaller impacts.

revalidation lists provide the equivalent of a census for each IDP camp. The revalidation lists include data on all household members including their name, gender, and age, and the block where the household resides within the camp. Households with primary school-aged children, children aged 6-17, were randomly sampled. Random sampling was stratified by block with the fraction of the camp sample drawn from each block proportional to that block's share of households with children aged 6-17.

The primary sample for each camp consisted of 40 households. A secondary sample of 10 additional households was selected in each camp to provide alternates in cases where households in the primary sample could not be found. Data collection limitations resulted in each camp being visited only once in most cases. As a result, on average only slightly more than 29 households were interviewed per camp, resulting in a sample of 911 households in the baseline. The most common reason for a sampled household's absence was that the household did not exist. Survey staff were told by camp administrators that these 'ghost' households were sometimes created by camp residents attempting to obtain additional rations from the general food distribution. In other cases, the household did not have any children aged 6-17 living at home at the time of the interview. Other reasons households were not interviewed included the household seeking medical attention or working in the fields, though this was a less common occurrence.

The resurvey in 2007 aimed to locate those households sampled in 2005 and to resurvey them. The resurvey was complicated by the resettlement of households that began in Lira in April 2006 and later in Pader. We estimate that 70 percent of sample households had moved since the baseline survey. After a considerable effort tracking households using contacts provided in the baseline survey, baseline GPS locations, and assistance from local officials, we were able to find and interview 76 percent of baseline households. Given the substantial movement of sample households, the resurvey was quite successful in locating them.

1.5.2 Survey Instruments

The baseline data collection included several survey instruments. They consisted of a detailed household questionnaire, health data, a camp questionnaire, a school/learning center questionnaire, price lists, learning achievement tests, and unannounced attendance measures. Table 1.2 lists the survey instruments and type of data collected with each instrument. The most time-consuming data collection was the household questionnaire and health data.

The health data collection included height and weight measurements and Hemoglobin status. The finger prick method was used to collect a blood sample and the iron contained in the hemoglobin was determined on site using the Hemocue analyzer. This blood data protocol and the entire study received approval from the ethics review board at the National Council for Science and Technology in Uganda. Ethics approval was also received by the review board at the International Food Policy Research Institute. Non-response for blood data collection was not a significant problem. The health data was collected for the mother or female primary caregiver and for all children age 15 and under by local nurses.

Two separate groups of achievement tests were developed by the Uganda Education Standards Agency, a testing branch of the Ministry of Education and Sports. The first group was appropriate for grade 2, lower primary, and included a literacy test and a numeracy test. The second was appropriate for grade 5, upper primary, and included a literacy test, a numeracy test, and a general knowledge test. The tests were developed in consultation with senior teachers from Pader and Lira districts to ensure their relevance and were pretested using students at schools in those districts that were not in the study. The lower primary tests were administered to children in the baseline sample enrolled in grades 2 and 3, as well as to children in the sample age 7-9 who were not enrolled in school. The upper primary tests were administered to children enrolled in grades 5 and 6 and to non-enrolled children age 10-12.

The resurvey instruments were created to be comparable to those from

Table 1.2: Baseline Survey Instruments

Survey Instrument	Topics and Respondent
Household survey	Household demographics, housing conditions, sanitation, water sources, camp details, employment, agricultural activities, assets, WFP and other aid, credit, non-food consumption, food consumption, education, health status (children and mothers) and knowledge, healthcare providers, child activities, mother/primary caregiver activities, social capital, shocks, parenting assessment, GPS location of household Respondent: household head or spouse
Health survey	Immunization history, other health card data, anthropometry (weight, height), hemoglobin status; covering female respondent and all children under age 15 Respondent: female head of household or primary caregiver and children under age 15 (for physical measurement only)
Camp questionnaire	Camp formation, camp demographics, infrastructure and services, camp access, main activities and income sources of camp residents, camp financing and government/aid agency/NGO support, camp administration and decision making, security and shocks Respondent: Formal camp leader or other camp administrator
Learning center questionnaire	GPS location, learning center characteristics and rules for grade promotion, personnel characteristics, physical infrastructure, teaching materials, examination performance, school fees and finance, school management and decision making, school feeding Respondent: Head teacher or other learning center administrator
Price list	Prices for food consumption items Respondent: retail sellers in local market
Achievement tests	Literacy test for lower primary (grades P2/P3 or ages 7-9) Numeracy test for lower primary (grades P2/P3 or ages 7-9) Literacy test for upper primary (grades P5/P6 or ages 10-12) Numeracy test for upper primary (grades P5/P6 or ages 10-12) General knowledge test for upper primary (grades P5/P6 or ages 10-12) Respondent: school age child
Unannounced attendance visits	Morning and afternoon attendance collected by unannounced visits twice per month April 2006 - January 2007 Respondent: child age 6-17

the baseline. The household questionnaire was shortened somewhat and contained many of the same modules though some questions were altered. Furthermore, new sections were added while others were dropped. Sections covering the details of the food for education programs were added. New achievement tests were written by the Education Standards Agency for the same target classes and age categories. The upper primary general test was dropped[6] and all of the tests contained entirely new questions, because some individuals wrote the same level test in both the baseline and resurvey. The achievement tests were developed and pretested using the same methods as in the baseline. The health data collected was unchanged. Camp questionnaires were administered where sample households were still living in one of the 32 original IDP camps or in a newly created resettlement camp. In those areas where households had moved home, village questionnaires were given. Similar price lists were administered as during the baseline as well as school/learning center questionnaires. There were significantly more schools in the resurvey because of resettlement. Many schools left the learning centers and moved back to their original locations or to a smaller learning center in a resettlement camp.

One new survey instrument was added to measure cognitive development. Two standard cognitive development tests were administered to all children between the ages of 6 and 13. They were administered by locals with backgrounds in psychology. The cognitive development testing was a one-on-one test administered orally in the local language. The first component was the Raven's Colored Progressive Martrices test which assesses reasoning in the visual modality and intellectual efficiency; the ability to become more efficient by learning from immediate experience with the problem (Mills and Ablard (1993)). It is a test of inductive reasoning with the problems becoming progressively more difficult. The Raven's Colored Progressive Matrices was constructed to measure "the ability to forge new insights, the ability to discern meaning in confusion, the ability to perceive, and the ability to identify relationships" (Raven et al. (1996), p.1). The test is as a series of

[6]Therefore, the impacts of the FFE programs on this learning measure cannot be estimated.

pictures in which a pattern is displayed with a piece missing. Five pieces are displayed at the bottom of the page with candidate patterns to replace the missing piece. The test taker is asked to select the piece that completes the pattern correctly. The test includes 36 such pictures, which become increasingly difficult. This test was standardized in a study conducted among a similar population in Western Kenya (Costenbader and Ngari (2001)).

The second component of the cognitive development testing was the Wechsler Digit Span subtest of the Wechsler Adult Intelligence Scale-Revised. The digit span test consists of two components; digits repeated forward and digits repeated backward. It is the most frequently used clinical measure of short-term auditory memory. The digit span forward test is a process involving attention and the holding of information while the digit span backward test is a more complex task that involves the additional process of converting information into the reverse order. Different psychological processes are involved in either task.

Data was also collected, at both the household and learning center level, regarding Primary Leaving Exam results. At the end of each school year, Ugandan pupils in grade 7, the last year of primary school, take the PLE, a national exam conducted by the Uganda National Examinations Board. Uganda's Ministry of Education and Sports uses the PLE to determine whether primary school pupils can be promoted to secondary school. Children who perform well on the PLE exam are also more likely to be admitted to a better quality secondary school, so the stakes for this exam are considerable.

The PLE consists of four exams: English, social studies, science, and mathematics. Each PLE exam is graded on a 9-point scale, grade 1 being the highest and 9 the lowest. The numeric grades on the four exams are added to give the aggregate score, ranging from 4-36, with 4 being the best score. The aggregate score is used to place the successful candidates into four passing divisions. To facilitate the interpretation of results, we inverted the scales for the division and aggregate scores into increasing measures of test performance, so that an improvement in test scores would be positive.

We have two sources of data regarding PLE results. First, households

responding to the household survey in 2007 were asked to recall the PLE scores of any child who was no longer enrolled in primary school in April 2007 and who had taken the PLE exam since 2005. The second source of data is from the learning center questionnaires in 2007. The school level data provides the share of students in a given primary school that passed the PLE in 2006.

1.5.3 Data Collection

For the baseline data collection, training of the enumeration team and pretests of the survey instruments was conducted from September 7 - October 7, 2005. In addition, the survey team held a one day introductory meeting with camp leaders from all 32 IDP camps in the study to inform them about the purpose of the study and the methods of data collection. In Lira, the household and health data collection was conducted from October 7 - November 5 in 13 of the 16 camps. The remaining three camps in Lira were visited from December 3 - 6. In Pader, household and health data collection took place from November 11 - 25. Data for the other instruments, including camp questionnaires, learning center questionnaires, price lists, and achievement tests, was collected from December 5 - 17. In addition, the collection of attendance data via unannounced visits by a survey team member was conducted periodically between the end of the baseline data collection and the beginning of the resurvey.

During the baseline study, the enumeration teams resided in Lira town or Pader town Council, traveling to an IDP camp for enumeration each morning, and returning to the district town each evening for security reasons. Under these conditions, nearly all of the household and health survey data had to be collected in one day at each camp. At most camp visits, there were 31 household enumerators present and only enough time for household survey enumerators to complete one household questionnaire. In some cases, questionnaires that could not be completed on the first visit were completed during a follow-up visit, such as those in which achievement tests were administered. As a result, only slightly more than 29 households were

interviewed per camp during the baseline, well below the target of 40.

Data was collected on 911 households in the baseline survey, compared to the intended sample of 1240. This reflects the difficult conditions for data collection and the inability of the survey team to revisit camps for later enumeration. In general, fewer health questionnaires were collected than household questionnaires. This is due in part to the logistical difficulties of getting children and their mothers to a central location in the camp for physical measurement and blood collection.

The success in collecting the achievement test data in the baseline and matching it correctly to the household information was low. Only 271 children aged 6-17 took at least one of the math and literacy tests in that year, though many more were eligible. Many of the difficulties arose because the tests were conducted at the end of the period of household data collection, as the school year was ending, so it was difficult to locate the children. Nonetheless, there should be no systematic differences between the children who took the tests and those who should have but did not. The difference occurred because of field work constraints and enumeration errors, not individual characteristics of the sample children. Also, any factors affecting which children took the tests in the baseline study should be uncorrelated with treatment status.

The resurvey was conducted from March to April 2007, beginning in Pader district. As in 2005, the field work began with training and pretesting. During the resurvey, all of the survey instruments were completed on the same day in each camp. The number of households interviewed increased with the resurvey due in part to the improved security, allowing the enumeration team to leave town earlier and return later, and in part to the shortening of the household questionnaire.

The administration of the achievement tests in the resurvey was much more successful. There were 689 children aged 6-17 who took the tests during the 2007 survey round. For those children who were not tested in that year, it is unlikely that there was significant self-selection by the children or that the reasons for missing the tests are correlated with treatment status. All of the achievement tests in a camp or village were conducted on the one

day of data collection for that location, with no opportunity for second visits. Therefore, some children were missed if they were unavailable or if the household was interviewed late in the day. All of the achievement tests were conducted in the afternoon.

1.6 Conclusion

The conflict in Northern Uganda has had a great impact on the civilians of the region; displacing the rural population into IDP camps, limiting their productive opportunities, and resulting in many relying on aid for survival. In this context, data collection was a difficult undertaking. Baseline data was collected in 2005 before the introduction of any school feeding and during a time of intense conflict in the region. The resurvey data was collected in 2007 after the feeding programs had been in place for over a year and during a period of relative security and resettlement in the region.

The randomized design of the food for education experiment allows for the identification of the causal impacts of both the in-school meals program and the take-home rations program on education outcomes. The similarity of both programs in terms of the content and quantity of the food provided allows for the identification of differences in impacts due directly to the method of school food delivery; either as two daily cooked meals in school or as a dry ration given once a month to the household.

The many different survey instruments described above allow for the investigation of numerous questions of interest regarding school feeding, education, and conflict, among others. The following three chapters investigate some of these possibilities.

This dissertation consists of three major chapters. The second chapter uses this unique data set and the exogenous nature of the conflict and resulting displacement in Northern Uganda to examine their impacts on labour market participation. It finds that the longer the existence of the camp to which people moved, the less men work. In contrast, women's labour market decisions are not influenced by the age of the Internally Displaced People's camp in which they live. I argue that these responses result from

the development of gender-specific social norms regarding idleness and not from a lack of opportunities. A decline in the percentage of men working in a camp leads to a reduction in the probability that a given man works.

The third and fourth chapters provide solid empirical evidence of the educational impacts of two food for education programs. Joint with my co-authors, I compare education outcomes between three randomly assigned groups: Beneficiaries of an in-school meals (SFP) program, beneficiaries of a take-home rations (THR) program providing equivalent food transfers conditional on school attendance, and a control group. The findings suggest that, in general, both programs performed equally well in improving school participation. While access to both programs improved cognition, there the impacts on learning achievement are weaker.

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Chapter 2

Gender Differences in Labour Market Participation During Conflict: Evidence from Displaced People's Camps in Northern Uganda[1]

2.1 Introduction

Wars and civil conflicts have substantial destructive impacts on human capital formation, infrastructure, institutions, output, and growth at the country-level (Hoeffler and Reynal-Querol (2003), Collier et al. (2003), Stewart (2001), and Collier (1999)) yet the evidence of their impacts at the micro-level is mixed. Most articles in this growing literature analyze the effects of conflict on a variety of individual and household level outcomes and generally find significant impacts on some, but not all, outcomes of interest. A summary of this literature is provided in Appendix A.1. Moreover, identifying the consequences of conflict are complicated by difficulties in determining the direction of causation.

[1] A version of this chapter will be submitted for publication. Lehrer, K. Gender Differences in Labor Market Participation During Conflict: Evidence from Displaced People's Camps in Northern Uganda.

In addition to the direct consequences, conflicts often cause mass displacement, both during and for some time after, the cessation of hostilities. Conflict-induced displacement is a reoccurring phenomena with poorly understood consequences. According to the Internal Displacement Monitoring Centre (IDMC) in 2005 there were 23,700,000 internally displaced people[2] in 51 countries worldwide. Uganda had the third largest population of internally displaced people in December 2005 with 1,740,498 people internally displaced according to the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA). Globally, the length of time people are displaced from their homes ranges from days to over 50 years.

Displacement itself has serious repercussions and the impacts on those displaced have rarely been investigated[3]. The creation of an Internally Displaced People's (IDP) camp is an abrupt formation of a new community. Over time the new community develops norms regarding behaviour through social interactions. These new social norms affect many aspects of behaviour including the decision to participate in labour market activities. Moreover, the reactions to conflict and displacement may differ significantly by gender. This paper shows that social norms affect labour market behaviour differently for men and women in Internally Displaced People's camps in Northern Uganda.

I use household survey data I collected in 2005 during the conflict in 32[4]

[2]Internally displaced persons are "persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalised violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognised State border." (Guiding Principles on Internal Displacement, Introduction, paragraph 2).

[3]The literature regarding conflict-induced displacement has primarily focused on refugees (Werker (2007), Jacobsen (2002), and Scoones (1998)). There are many similarities in the economic conditions in refugee camps and Internally Displaced People's camps. One important distinction is the restrictions on employment and movement often placed on refugees by their host country, because they lack citizenship, that are not imposed on internally displaced people. However, employment and movement are, in fact, more restricted in some IDP camp settings. In the Northern Uganda context, employment per se is not restricted by the government but movement is heavily restricted due to the conflict and thus employment opportunities are limited.

[4]Chapter 1 stated that data was collected in 31 IDP camps. In fact, data was collected in 32 camps but only 31 camps were valid for the food for education evaluation. Orit

Internally Displaced People's camps in Lira and Pader districts of Northern Uganda. I exploit the exogeneity of camp choice and camp formation to examine camp characteristics that determine labour market participation. The findings suggest that the length of time the camp has been in existence, camp age, has a strong negative impact on the probability men work. Yet women's labour market participation is not influenced by camp age. I control for other camp characteristics that have been cited as explanations for male idleness, including conflict intensity and measures of work opportunities, and continue to find the same strong result. Further robustness checks include controls for individual and household characteristics, including the amount of time that the household has spent in the camp. The results suggest that a culture of male idleness develops in camps over time and this hypothesis is tested empirically.

This study emphasizes the negative effects of moving to an established community of male idleness in contrast to the migration literature where moving to an area with established migrants leads to better labour market outcomes (Damm (2006) and Munshi (2003)). However, the results are consistent with the findings of both Edin, Fredriksson and Åslund (2003) and Bertrand, Luttmer and Mullainathan (2000) who demonstrate that an increase in the fraction of the reference group using welfare increases the individual probability of welfare use.

The impact of displacement on labour market outcomes has been investigated by both Ibáñez and Moya (2006) and Kondylis (2007), though in very different circumstances. Ibáñez and Moya (2006) study the impact of forced migration in Colombia on unemployment as well as the impact of an income generation program in that setting. Their results show large short and long-term consequences of forced displacement. Unemployment rates increase dramatically during the first months of displacement; from 1.7 percent for

camp in Lira district was dropped from the evaluation. It was assigned to the take-home rations program but the WFP Lira district office decided to provide it with in-school meals because the schooling situation was very poor in the camp. Therefore, the randomization was not valid for this camp. In this chapter, I use the baseline data and am not interested in the food for education program. Therefore, there is no compelling reason to drop the data from Orit camp here.

household heads prior to displacement to more than 50 percent during the first three months after displacement. After a year of settlement, the unemployment rate for displaced household heads decreases but remains high, equivalent to that of the urban extreme poor. Their findings also suggest that the income generation programs are effective at temporarily increasing labour income but that the impact disappears once the program ends. The situation in Colombia is quite different from that of Northern Uganda. In Colombia displacement usually takes place on an individual basis, unlike the massive displacement in Northern Uganda. Furthermore, in Colombia the destination of migration is existing communities whereas migration in Northern Uganda is primarily to IDP camps.

Kondylis (2007) investigates the impact of displacement in Bosnia & Herzegovina on post-war labour market outcomes. Once she controls for selection into displacement, she finds that displaced men and women are less likely to be in work relative to stayers. Moreover, displacement leads to higher post-war unemployment for men, whereas it has no significant impact on the employment status of women. It solely decreases women's participation. Finally, she finds no impact on wages or hours worked for both men and women. While Kondylis analyzes post-war labour market outcomes, this chapter investigates the labour market outcomes while displaced.

The chapter is organized as follows. Section 2.2 briefly summarizes the conflict and prolonged displacement in Northern Uganda, as described in chapter 1. The data is also described in this section. Section 2.3 introduces the estimation strategy and provides evidence of the assumptions underlying the estimation method; the exogeneity of camp age. Results are reported and discussed in section 2.4. I find that the longer the existence of the camp to which people moved, the less men work. Furthermore, I show that this result is being driven by a response to the overall labour market participation of men in the community and not to a lack of opportunities. Moreover, I show that women's labour market decisions are not influenced by the age of the IDP camp in which they reside. Section 2.5 concludes with a summary of the findings and a discussion of the policy implications.

2.2 The Context and the Data

2.2.1 Conflict and Displacement in Northern Uganda

This section provides an overview of the conflict and displacement in Northern Uganda. A more detailed description can be found in chapter 1. The identification strategy relies on the exogeneity of the conflict and the resulting date of IDP camp formation. Therefore, section 2.3 elaborates on the random nature of both the conflict and displacement. Section 2.3 also demonstrates empirically that camp age and camp-level conflict intensity were not determined by observable local pre-displacement characteristics.

The conflict in Northern Uganda involves a rebel group called the Lord's Resistance Army. This group lacks a defined goal and has attacked and terrorized the Northern population. In reaction to this insecurity, the rural population was displaced into Internally Displaced People's camps. Another feature of camp life is idleness, particularly of men (Petty and Savage (2007), Bøäs and Hatløy (2005), Okot et al. (2005)). Observers have claimed that this has led to a high level of male drunkenness, disorder, and domestic violence(Makerere University (2005), Adoko and Levine (2004), Isis-Women's International Cross Cultural Exchange (2001)). Yet people who are drinking or being idle are easily noticed and this may have led observers to conclude that the problem is larger than it actually is. This chapter provides evidence of the extent of male idleness and its causes.

2.2.2 Data Description

A detailed description of the data used here is provided in chapter 1. It was collected prior to the implementation of the food for education programs. The sample consists of 885 households. The data was collected using a detailed household questionnaire and an IDP camp questionnaire to which the camp leader or another camp administrator responded.

Sample characteristics are presented in table 2.1. Mean household size in the sample is 5.93 household members. On average, households left their ancestral homes 39 months, 3 years and 3 months, prior to being interviewed

Table 2.1: Sample Characteristics

Household Characteristics			
	Mean	Standard Deviation	
Household Size	5.93	(1.91)	
Agricultural Land (acres)	8.41	(9.28)	
Number of Months Displaced	38.87	(20.11)	
Lira	29.84	(11.06)	
Pader	47.34	(22.83)	
Distance of Home to Camp (miles)	4.87	(4.19)	
Percentage Literate			
Men			0.80
Women			0.32
Percentage with Family Member Killed			0.66
Number of Households			885
Camp Characteristics			
Camp Age (months)	40.69	(21.52)	
Camp Population	19213.69	(13409.02)	
Area of Camp (square miles)	0.55	(0.57)	
Distance to Nearest Market (miles)	12.90	(19.60)	
Distance to Nearest Major Town (miles)	26.99	(11.24)	
Distance to Nearest IDP Camp (miles)	5.88	(2.42)	
No. of Soldiers Typically Guarding Camp	59.07	(91.76)	
Number of Camps			32

for the baseline survey with the majority coming directly to the IDP camp in which they resided in 2005. There is considerable variation in the date when households left their land, particularly by district. On average, residents of Lira district left their homes over a year after those in Pader. This is consistent with the expansion of the conflict from the Acholi region of Gulu, Kitgum, and Pader, to surrounding areas, including the Lango region of Lira district. Therefore, the district of residence is controlled for in all specifications. Moreover, the estimation is also run separately for Pader and Lira districts and presented in Appendix A.3.

On average households' ancestral lands are located near the IDP camp in which they reside with a mean distance of 4.87 miles. Though at first glance

this appears to be a short distance, households had considerable difficulty accessing their homes due to the additional security threats they faced when leaving the camp boundaries. Forty-six percent of households had not visited their homes in the previous 6 months.

Camp size and population vary greatly in Northern Uganda. In the sample the mean camp population in 2005 was 19,214 people on a mean area of 0.55 square miles. The mean distance from a camp to the nearest market is 13 miles and the mean distance to the nearest major town or employment source is 27 miles; making them inaccessible on a daily basis. The nearest neighbouring IDP camp is on average a distance of 6 miles away.

Security in the camps is not guaranteed. The number of UPDF soldiers typically guarding a camp is 59. Only three camps in the sample did not have any camp residents directly threatened or attacked, either in the camp or nearby, in the previous 12 months. 53.13 percent of camp leaders report food shortage as the greatest problem affecting the camp, with 21.88 percent reporting health problems, and 15.63 percent reporting lack of water as the greatest problem. No camp reported lack of employment opportunities as the greatest problem affecting the camp and its residents.

Table 2.2 presents a summary of the primary income generating activities of men and women. In the sample men's labour market participation practically mirrors that of women. Farming remains the primary activity of both, while most casual employment is gender specific. A detailed description of activity choice is presented in Appendix A.2.

2.3 The Exogeneity of the Conflict and Displacement

2.3.1 The Process of Displacement and Camp Formation

This chapter exploits the exogeneity of the conflict, IDP camp choice, and camp formation to identify the impacts of displacement on individual labor market outcomes. The estimation method relies on the assumption that unobservable determinants of individual labor market participation are

Table 2.2: Work Activities by Gender: Percentage of Sample by Activity

Primary Activity	Male	Female
In Agriculture	54.97	57.94
Own land	32.25	33.95
Share-cropped, leased or rented land	15.01	16.22
Agricultural labourer	7.71	7.77
Gathering firewood for sale	6.29	6.42
Burning charcoal for sale	6.09	1.86
Odd jobs	6.09	4.73
Porter	4.46	4.22
Making handicrafts/pottery	3.85	1.52
Brick laying/building	3.04	0.17
Policing/security	2.84	0.00
Petty trade	2.03	1.69
Fetching water for sale	2.03	1.35
Teaching	1.83	0.68
Food Sales	0.81	5.07
Domestic Work	0.41	2.87
Brewing	0.20	7.94
Other	5.06	3.54

Notes: Primary activity in the 7 days prior to the interview.

uncorrelated with camp age.

I assume that the reduced-form equation of the decision to participate in the labour market follows a simple linear model which is formalized in equation 2.1,

$$y_{ic} = \alpha + \beta \log(\text{camp age})_c + \gamma x_{ic} + \delta z_c + u_{ic} \tag{2.1}$$

where the subscript i refers to the individual, and c to the IDP camp. The dependent variable is a dummy variable for whether or not the individual worked in the previous 7 days or in the previous 30 days. Camp age is measured in months. x_{ic} is a vector of individual and household characteristics, including the age of the individual, their literacy status, the size of the household, and measures of conflict intensity at the household level. z_c are camp characteristics which include the IDP camp population, its access to markets, and measures of insecurity at the camp level.

According to all accounts, conflict intensity triggered camp formation. Furthermore, conflict intensity can be seen as random (Blattman (2006), Bøäs and Hatløy (2005), Refugee Law Project (2004), and Nabudere (2003)). The LRA's terrorizing of the local population did not take place throughout the area at once. The LRA attacked different areas of the region at different times for many reasons which are not fully understood. The LRA moved throughout the region in units; attacking, abducting, destroying, stealing, and terrorizing as they moved. Attacks could be motivated by a number of factors. For instance, if an abductee escaped from captivity, a common response was for the LRA to attack the village of the recently escaped abductee. This tactic was employed to demonstrate, to both current abductees and to the Northern population, their displeasure with, and the consequences of, escape. Other villages were attacked because the local population was perceived to be be loyal to the government and unfriendly to the LRA. This could have been the result of local leadership having made radio announcements that were interpreted as unfriendly or from a belief within the LRA whose origin has yet to be understood.

Finally, the spiritual component of the LRA has been cited as directing

them to attack certain regions. According to accounts from escaped abductees in Nabudere (2003), "Joseph Kony's military orders seem to be 'external' to him. The orders are given while he is entranced and possessed by spirits 'from very different places.'" (p.44). The pattern of attack throughout the region does not appear to have been systematic with respect to local characteristics. Except for the perception of allegiance to the government, whose validity is uncertain, local characteristics of the general population were not the primary cause for attack. The LRA attacked to terrorize, to abduct, and to steal cattle and local crops.

The exogeneity of conflict intensity has been previously cited and demonstrated. Attacks and abductions by the LRA have been characterized as random and exogenous of victims' socio-economic characteristics. According to Bøäs and Hatløy (2005), "[the LRA's] violence is random, unpredictable, and highly visible and symbolic. Its killings, mutilations and abductions are a method implemented to institute its control over the population, and the randomness of their violence compensates for their inferiority in numbers" (p.33). Blattman (2006) argues that there is exogenous variation in rebel recruitment practices and he uses this exogeneity to identify the impact of abduction on several individual outcomes including education, earnings, and political participation. He cites interviews with rebel leaders in which they claim that targets were generally unplanned. "Abduction party leaders claim to have raided whatever homesteads they encountered, regardless of wealth, location, and household composition" (p.10). Using data from a survey of war affected youth in Northern Uganda, Blattman also finds little difference in pre-war characteristics between abducted and non-abducted youth.

The formation of an IDP camp and the displacement of the local population was a response to this insecurity but the particular timing of camp formation and displacement resulted from several possible triggers. Camp formation and displacement in the region exploded in 2002 when the security situation in Northern Uganda deteriorated due to the LRA's re-entry with full force into the region from their bases in Southern Sudan. Some IDP camps had already been established prior to this new wave of intense

rebel activity; some as early as 1996 during an earlier period of heightened insecurity in the region. Camps formed throughout Lira and Pader districts over time. The majority of IDP camps in Pader formed before those in Lira. Lira district is located directly south of Pader district (see figure 1.1) and so the LRA, coming from Sudan, which borders Uganda to the north, passed through Pader on their way to Lira, and in doing so, terrorized the population of Pader. This led to the formation of many camps in Pader before those in Lira.

Many IDP camps formed in response to a specific attack or incident in the area. In reaction, people moved to a nearby village or to the area surrounding the military barracks in search of security. Another possibility leading to camp formation was for an abductee from the area to have escaped and, fearing retribution, the local population relocated. In other cases no specific event triggered the formation of the camp. General insecurity in the area led people to leave their homes and the camp formed as a result. A combination of these events often led to a camp's formation. In all instances the camp was thought to be a short-term solution to the insecurity until the LRA was defeated militarily and individuals could return home. Furthermore, it was often the case that people first began to leave their homes voluntarily in search of temporary security. The UPDF then forced the rest of the local population into the camp and assumed anyone still living outside the camp boundaries to be a rebel. This approach was part of a military strategy for defeating the rebels and was supposed to protect civilians. According to Civil Society Organisations for Peace in Northern Uganda (2004, p.64), on October 3, 2002 the UPDF gave civilians in the Acholi sub-region 48 hours to move into 'protected villages' or they would be considered rebel collaborators and arrested or shot.

Therefore, in most cases, households relocated to the nearest camp. Moreover, because the relocation was expected to be for a short period of time, individuals did not base the decision of where to relocate on camp characteristics other than its proximity to their home. In the sample used in this study, in 2005, 78 percent of sample households remained in the camp to which they had first moved when they left their homes. Therefore, in the

analysis I report results for all households as well as the restricted sample of households who remained in the original camp to which they fled. The identification strategy I use relies on the claim that the time an area first became insecure and the subsequent date on which the camp was formed is unrelated to unobservable determinants of individual labour market activity.

2.3.2 Evidence of Exogeneity

The data provides some evidence of the exogeneity of the intensity of the conflict, the length of time since the formation of the camp, and the selection of camp residence. This is accomplished by verifying that observable characteristics are not determinants of conflict intensity, camp age, and camp choice. Results are reported in tables 2.3 - 2.5.

Several measures of socio-economic status prior to the movement of individuals to IDP camps were captured in the household survey[5]. The household level measures of conflict are whether or not an immediate family member was killed as a result of LRA activity as well as the number of family members killed, and whether any current household member was ever abducted by the LRA. Pre-displacement characteristics are the amount of land owned prior to displacement, the value of livestock owned, and the literacy status of the household head. Results are reported in table 2.3, columns (1)-(3). Neither the literacy of the household head, which was determined prior to displacement, nor the amount of land or the value of livestock owned prior to displacement determined the degree to which a household was affected by the conflict[6].

Columns (4)-(8) report results at the camp level[7]. The dependent vari-

[5]The time period before the movement of the household to an IPD camp is considered to be 'before the conflict'. Though the conflict began in 1986, it intensified in the late 1990s and early 2000s, forcing the population's movement to IDP camps.

[6]Results are unchanged if the value of land owned or the value of total assets prior to displacement replace the amount of land owned in the regressions. Agricultural land acreage is reported because fewer observations are missing. Results are largely unchanged if literacy, livestock, and land are included in separate regressions.

[7]Camp level results are reported because the sample was selected at the camp level, not the sub-county level. The sample is not representative at the sub-county level and is highly unbalanced.

Table 2.3: The Exogeneity of the Conflict

	Household Level Variables			Camp Level Variables				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Family Member Killed	Number Killed	Family Member Abducted	Mean Killed	Mean No. Killed	Mean Abducted	Percentage Killed	Percentage Abducted
Household Head	-.012	.025	.074	.191	2.198	-.416	.002	.008
Literacy	(.051)	(.211)	(.058)	(.272)	(1.387)	(.296)	(.007)	(.026)
Agricultural Land	.0009	-.006	.001	.014	.046	.010	.0005	.001
Owned	(.003)	(.011)	(.003)	(.012)	(.059)	(.015)	(.0004)	(.001)
Value of Livestock	-.001	.007	.006	.029	-.153	.081	.0002	-.004
Owned	(.007)	(.031)	(.006)	(.036)	(.225)	(.052)	(.001)	(.005)
Pader	.023	.335	.097	-.042	.039	.037	-.002	-.002
District	(.046)	(.233)	(.062)	(.083)	(.359)	(.081)	(.002)	(.006)
Constant	.647***	1.838***	.245***	.364*	.066	.459*	-.003	-.0008
	(.050)	(.237)	(.058)	(.219)	(1.098)	(.253)	(.007)	(.017)
No. of Observations	780	780	780	32	32	32	30	29
R^2	.001	.004	.019	.123	.13	.366	.095	.037

Notes: Standard errors are in parentheses and are clustered at the sub-county level in columns (1) - (3). * significant at 10%, ** significant at 5%, *** significant at 1%. Households in the sample lived in 34 sub-counties in Northern Uganda prior to displacement. Regressions in columns (1)-(3) are weighted by the camp population divided by the number of individuals sampled per camp and those in columns (4)-(8) are weighted by the camp population. Value of livestock is in millions of Ugandan Shillings.

ables in columns (4)-(6) are the sample means of the household level data while columns (7) and (8) use the percentage of the current camp population ever killed as a result of the insurgency and the percentage ever abducted, as reported by a camp administrator. As at the household level, no observable camp characteristics are determinants of camp level violence.

Thus far I have argued that conflict intensity, at both the household and camp level, was not determined by observable pre-displacement characteristics. Table 2.4 presents results demonstrating that the date of camp formation was, likewise, not determined by pre-conflict characteristics. The dependent variable is the log of the age of the camp measured in months. Column (1) includes the pre-displacement characteristics included in the regressions in table 2.3. Neither literacy, the amount of agricultural land owned, or the value of livestock owned were significant determinants of camp formation. Measures of conflict intensity are included as explanatory variables in columns (2)-(4). Camp level variables are constructed by taking means of the household level conflict variables in columns (1)-(3) of table 2.3[8]. Unfortunately, the data does not distinguish between deaths and abductions pre- and post-displacement. Therefore, these results should not be interpreted as causal. Results show only a weak relationship between camp age and conflict intensity, as measured by abductions and deaths at the household level. This is not surprising given that camp formation was not only triggered by abductions and murders but also by threats on local areas made by the LRA, suspicions, attacks not causing abductions or deaths, and government force. All regressions include a control for the district in which the camp is located. As described in section 2.3.1, camps generally formed in Pader district prior to Lira district because the LRA traveled through Pader to reach Lira.

Finally, I argue that households moved to the nearest IDP camp believing the move to be temporary. I examine whether individual characteristics

[8]The percentage of the current camp population ever killed as a result of the insurgency and the percentage ever abducted, the dependent variables in columns (7)-(8) of table 2.3, are measures of conflict intensity since the formation of the IDP camp. Therefore, these measures are not included as determinants of camp age.

Table 2.4: The Exogeneity of Camp Formation

	Camp Age			
	(1)	(2)	(3)	(4)
Mean Household	-.496	-.611	-.870	-.407
Head Literate	(.532)	(.512)	(.564)	(.515)
Mean Agricultural	.059*	.051	.051	.057
Land Owned	(.035)	(.035)	(.034)	(.037)
Mean Livestock Value	.020	.003	.046	.003
Owned	(.068)	(.066)	(.071)	(.085)
Percentage		.602		
Killed		(.441)		
Number			.170*	
Killed			(.087)	
Percentage				.214
Abducted				(.451)
Pader	.165	.191	.159	.158
District	(.243)	(.242)	(.239)	(.243)
Constant	3.401***	3.182***	3.390***	3.303***
	(.475)	(.460)	(.432)	(.436)
No. of Observations	32	32	32	32
R^2	.433	.461	.501	.437

Notes: Standard errors are in parentheses. * significant at 10%, **significant at 5%, *** significant at 1%. Observations are weighted by the camp population.

determined the distance between a household's land and the IDP camp in which they reside. The individual characteristics of interest are the age of the household head, his literacy status, the wealth of the household prior to displacement, as measured by the amount of land and value of livestock owned, and household size. Additionally, household conflict measures are included as regressors to examine whether households more directly affected by the conflict moved further away from their homes. Finally, the age of the camp is included to determine whether individuals who moved to older camps moved further away. Results are reported in table 2.5. Individual and household observable characteristics as well as camp age are not significant determinants of the distance between the IDP camps and households' ancestral land.

Tables 2.3 - 2.5 demonstrate that observable individual, household, and camp characteristics are not significant determinants of conflict intensity and camp age. Therefore, the estimation strategy assumes that both are exogenous in the decision to work. The mechanism through which camp age affects labour market participation is investigated using an instrumental variables approach. The rationale is that social interactions influence the decision to work. A culture of idleness amongst men has developed in IDP camps over time. It takes time for the norm of unemployment to develop and diffuse throughout a camp. Thus, camp age is used as an instrument for camp level employment. Many other camp characteristics are investigated as possible instruments but are not significant determinants of camp level employment. Furthermore, I argue and provide some empirical evidence supporting the exclusion restriction for the use of camp age as a valid instrument.

2.3.3 Outcomes of Interest

The two outcomes of interest are dummy variables for labour market participation; one for the 7 days prior to the interview date, and one for the 30 days prior. Summary statistics of these variables are presented in table 2.6, separately for men and women and by the age of the IDP camp. The

Table 2.5: The Exogeneity of Distance Displaced

	Distance Displaced (miles)				
	(1)	(2)	(3)	(4)	(5)
Household Head	-.002	-.002	-.003	-.001	-.002
Age	(.017)	(.016)	(.016)	(.017)	(.017)
Household Head	-.372	-.376	-.382	-.351	-.344
Literate	(.377)	(.379)	(.383)	(.380)	(.367)
Agricultural Land	.006	.006	.007	.007	.003
Owned	(.016)	(.016)	(.016)	(.016)	(.017)
Livestock Value	.040	.041	.040	.042	.046
Owned	(.079)	(.080)	(.080)	(.079)	(.079)
Household	-.021	-.017	-.020	-.023	.0007
Size	(.117)	(.120)	(.119)	(.116)	(.125)
Family Member		.231			
Killed		(.437)			
Number			.108		.098
Killed			(.083)		(.082)
Household Member				-.241	
Abducted				(.348)	
Log (Camp					.948
Age)					(.596)
Pader	.847	.841	.810	.871	.370
District	(.560)	(.562)	(.567)	(.551)	(.554)
Constant	5.042***	4.893***	4.882***	5.094***	1.537
	(1.281)	(1.327)	(1.288)	(1.265)	(2.527)
No. of Observations	777	777	777	777	777
R^2	.014	.015	.019	.015	.024

Notes: Standard errors are in parentheses and are clustered at the sub-county level. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are weighted by the camp population divided by the number of individuals sampled per camp.

IDP camps are divided into two categories; the younger camps that have existed for less than 38 months, the median age of the camps in the sample, and the older camps that have operated for 38 months and longer. The statistics show only small differences in women's labour force participation between the older and younger camps. However, men in older camps appear to work less than those in younger camps. This link is investigated further in figure 2.3.3 which depicts the relationship between the decision to work in the previous 7 days and camp age. The first panel shows the negative relationship between the percentage of men who worked in the previous 7 days and the age of the IDP camp in which they live. The second panel shows this relationship for women which is less striking and positive. This relationship is investigated further in the next section.

2.4 Results

2.4.1 The Impact of Camp Age

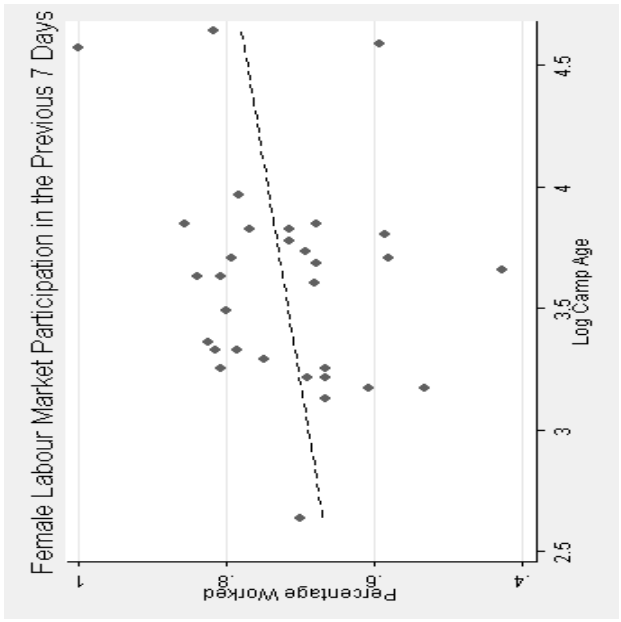
Given the random nature of the conflict and displacement in Northern Uganda, their impact on labour market participation is identified in a simple weighted least squares regression[9]. Tables 2.7 and 2.8 report results with camp age included as an independent variable in the determination of labour force participation. The purpose here is to see the direct link between camp age and the decision to work, differentiated by gender. Tables 2.7 and 2.8 show that camp age has a strong negative impact on the probability of work for men and that this result is robust. Moreover, tables 2.9 and 2.10 show that this relationship does not hold for women.

Table 2.7 presents results for men's labour market participation, both with and without controls. The findings suggest that a one percent increase in camp age leads to a 3% decrease in the probability that a man worked in the previous 7 days and to a 2% decrease in the probability that he worked in the previous 30 days. Columns (2) and (5) control for the length of time the household itself has lived in the camp. While camp age remains

[9]Results are largely unchanged when probit or logit regressions are estimated.

Table 2.6: Labour Market Participation: Summary Statistics

Variable	Mean	Standard Deviation	No. Observations
Worked in the past 7 days (0 or 1)			
Men	.718	.450	688
Women	.714	.452	830
Worked in the past 30 days (0 or 1)			
Men	.801	.400	688
Women	.847	.360	830
		Young Camps	
Worked in the past 7 days (0 or 1)			
Men	.763**	.426	334
Women	.715	.452	400
Worked in the past 30 days (0 or 1)			
Men	.844***	.363	334
Women	.843	.365	400
		Old Camps	
Worked in the past 7 days (0 or 1)			
Men	.675	.469	354
Women	.714	.452	430
Worked in the past 30 days (0 or 1)			
Men	.760	.428	354
Women	.851	.356	430



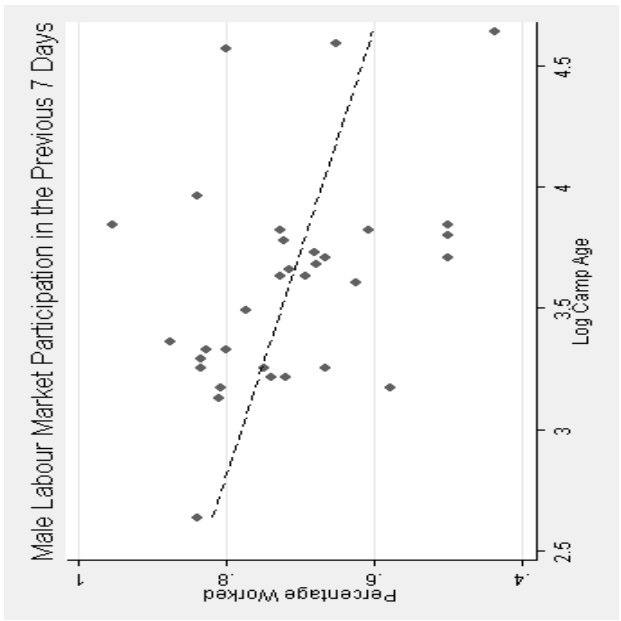


Figure 2.1: Labour Market Participation and Camp Age, by Gender

significant, the number of months the household has lived in the camp is not a significant determinant of labour market participation. Columns (3) and (7) include additional individual and household level controls, including the distance of the household from their home, which is a measure of the ease to which they have access to their land.

These results support the view that camp age is picking up a camp characteristic that is determining labour market participation. Therefore, columns (4) and (8) include additional camp characteristics that camp age may be capturing. The percentage of sample households in each camp who had an immediate family member killed is included as a control for conflict intensity. According to the Northern Uganda Internally Displaced Persons Profiling Study (2005), the more insecure the area around the camp, the less there is for the men to do. The distance to the nearest town and the type of road accessing the camp are included as controls for camp-level economic opportunity. Finally, the camp population and the diversity of camp residents are included as possible determinants of labour market participation. Camp age remains an important determinant of the decision to work while other camp characteristics are not significant.

Table 2.8 replicates the regressions reported in table 2.7 restricting the sample to households that remained in the IDP camp they first moved to when displaced. This restriction is imposed to address the possibility that those households that changed IDP camps moved because of unobserved camp characteristics that influence labour market participation and are correlated with camp age, making the assumption of exogeneity of camp age invalid. With this restriction, the sample is limited to 475 individuals. This restriction increases the magnitude of the impact of camp age on labour market participation and the results remain highly significant. Separate results by district are reported and discussed in Appendix A.3 for both men and women.

Finally, tables 2.9 and 2.10 report the same estimations as tables 2.7 and 2.8 but for women. The results show that camp age is not a determinant of women's decisions to work. Displaced women and men in Northern Uganda react differently to this characteristic of displacement. Men's work decisions

Table 2.7: Camp Age and Male Labour Market Participation

	7 Days				30 Days			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Camp Age)	-.294**	-.286**	-.270***	-.233***	-.211***	-.227***	-.217***	-.171***
	(.118)	(.115)	(.105)	(.082)	(.077)	(.079)	(.074)	(.065)
HOUSEHOLD LEVEL CONTROLS								
Log(Months in Camp)		-.011	-.011	.004		.022	.023	.038
		(.026)	(.026)	(.032)		(.028)	(.031)	(.032)
Household Size			.026**	.022***			.022**	.019*
			(.010)	(.008)			(.011)	(.010)
Family Member Killed			.091***	.121***			.125***	.143***
			(.034)	(.039)			(.045)	(.048)
Miles to Home			.0003	.0002			-.003	-.002
			(.006)	(.007)			(.004)	(.005)
INDIVIDUAL LEVEL CONTROLS								
Age			-.004*	-.003			-.004***	-.004***
			(.002)	(.002)			(.001)	(.001)
Literate			.102	.109*			-.005	-.002
			(.062)	(.063)			(.059)	(.060)
CAMP LEVEL CONTROLS								
Diversity of Camp Residents				.067				.070
				(.067)				(.045)
Camp Population				-.0009				-.012
				(.019)				(.015)
Miles to Town				.003				.0005
				(.003)				(.002)
Road - local				-.036				-.014
				(.066)				(.046)
Road - community				-.123				-.047
				(.092)				(.068)
Mean Killed				-.622**				-.322
				(.304)				(.232)
Pader District	.110	.111	.097	.117	.061	.058	.048	.041
	(.105)	(.106)	(.093)	(.077)	(.066)	(.067)	(.062)	(.059)
Constant	1.729***	1.737***	1.536***	1.662***	1.531***	1.515***	1.459***	1.452***
	(.367)	(.373)	(.255)	(.290)	(.242)	(.244)	(.208)	(.240)
No. of Observations	612	612	612	612	612	612	612	612
R^2	.05	.05	.091	.116	.034	.035	.08	.093

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are weighted by the camp population divided by the number of individuals sampled per camp. Diversity of camp residents is a dummy variable equal to one if most residents of the camp are from the immediate surrounding area (within 3 miles). Camp population is in tens of thousands of residents. Mean killed is the percentage of sample households by camp reporting having an immediate family member killed as a result of the insurgency. Road-local and road-community are types of roads providing access to the camp. The omitted category is federally-maintained road.

Table 2.8: Camp Age and Male Labour Market Participation: Never Moved Camp

	7 Days				30 Days			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Camp Age)	-.392**	-.376**	-.369**	-.325***	-.256**	-.266**	-.269**	-.230***
	(.181)	(.184)	(.158)	(.110)	(.114)	(.116)	(.106)	(.077)
HOUSEHOLD LEVEL CONTROLS								
Log(Months in Camp)		-.022	-.007	.016		.014	.030	.052
		(.044)	(.048)	(.051)		(.034)	(.038)	(.038)
Household Size			.042***	.038***			.034**	.032**
			(.013)	(.009)			(.014)	(.013)
Family Member Killed			.098**	.119***			.132***	.145***
			(.043)	(.044)			(.050)	(.052)
Miles to Home			.003	.003			-.001	-.0002
			(.007)	(.008)			(.006)	(.006)
INDIVIDUAL LEVEL CONTROLS								
Age			-.004*	-.004*			-.005**	-.006**
			(.002)	(.002)			(.002)	(.002)
Literate			.099	.091			-.036	-.044
			(.060)	(.059)			(.090)	(.096)
CAMP LEVEL CONTROLS								
Diversity of Camp Residents				.107				.092
				(.099)				(.072)
Camp Population				-.011				-.022
				(.026)				(.020)
Miles to Town				.005				.001
				(.004)				(.003)
Road - local				-.060				-.0006
				(.093)				(.060)
Road - community				-.156				-.055
				(.107)				(.079)
Mean Killed				-.618*				-.336
				(.367)				(.282)
Pader District	.197	.201	.172	.183*	.126	.123	.107	.099
	(.160)	(.161)	(.134)	(.110)	(.100)	(.101)	(.091)	(.079)
Constant	2.030***	2.050***	1.737***	1.829***	1.646***	1.634***	1.564***	1.584***
	(.561)	(.562)	(.409)	(.426)	(.356)	(.360)	(.340)	(.355)
No. of Observations	475	475	475	475	475	475	475	475
R^2	.073	.074	.138	.166	.038	.038	.103	.12

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are weighted by the camp population divided by the number of individuals sampled per camp. Diversity of camp residents is a dummy variable equal to one if most residents of the camp are from the immediate surrounding area (within 3 miles). Camp population is in tens of thousands of residents. Mean killed is the percentage of sample households by camp reporting having an immediate family member killed as a result of the insurgency. Road-local and road-community are types of roads providing access to the camp. The omitted category is federally-maintained road.

are influenced by the age of the IDP camp they reside in while women's are not. I posit that camp age is capturing social interactions amongst men. These results are presented in the following section.

2.4.2 Social Interactions

This section identifies the mechanism through which camp age influences the decision to engage in income generating activities. The hypothesis is that camp age is capturing the influence of the work choices of neighbours on labour market outcomes. The older the IDP camp, the more time has passed for a culture of idleness amongst men to have developed in a camp. Such a culture would take time to develop; a market for alcohol would form, small establishments for drinking would be built inside the camp, restaurants and venues for passing time would be established, such as, places for watching sports or videos. Finally, it would take time for the norm of unemployment to diffuse throughout a camp. In Acholi and Langi society, it would be acceptable for men to frequent these locales and not women. Thus, camp age would affect men's decisions to work through the influence of their neighbours but not the labour market decisions of women. Furthermore, the traditional male responsibility of ensuring the availability of food for their families is diminished in the camp setting because of the provision of food rations by WFP. A decline in this sense of responsibility may explain why men are more easily influenced by the idleness of others as compared to alternative settings.

Existing research in Northern Ugandan IDP camps has recognized male idleness, alcohol consumption, and the loss of men's traditional responsibilities (Stites et al. (2006), Makerere University (2005), Adoko and Levine (2004), Isis-Women's International Cross Cultural Exchange (2001)). According to Stites et al. (2006), "higher rates of male drunkenness were attributed to the stresses of losing their roles as male providers, stress and frustration from living in the camps, and the fact that drinking places are among the only social spaces in the camp"(p.50). This phenomenon is also described by Adoko and Levine (2004) who argue that "enforced idleness

Table 2.9: Camp Age and Female Labour Market Participation

	7 Days				30 Days			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Camp Age)	.064	.048	.056	.089	.006	.006	.007	.037
	(.044)	(.045)	(.047)	(.059)	(.042)	(.040)	(.038)	(.048)
HOUSEHOLD LEVEL CONTROLS								
Log(Months in Camp)		.023	.025	.023		-.0009	.002	.004
		(.044)	(.047)	(.048)		(.039)	(.041)	(.041)
Household Size			-.0003	.0007			-.003	-.003
			(.010)	(.010)			(.009)	(.009)
Family Member Killed			-.035	-.033			-.002	-.005
			(.044)	(.049)			(.051)	(.053)
Miles to Home			-.002	-.003			-.001	-.001
			(.005)	(.005)			(.005)	(.005)
Single-Headed			-.042	-.045			-.028	-.029
			(.050)	(.050)			(.041)	(.041)
INDIVIDUAL LEVEL CONTROLS								
Age			-.0007	-.0009			-.002*	-.003*
			(.002)	(.002)			(.001)	(.001)
Literate			-.012	-.025			.006	-.003
			(.049)	(.050)			(.043)	(.043)
CAMP LEVEL CONTROLS								
Diversity of Camp Residents				.006				.006
				(.030)				(.028)
Camp Population				.029***				.008
				(.010)				(.011)
Distance to Town				-.004				-.003
				(.002)				(.002)
Road - local				-.012				.001
				(.034)				(.031)
Road - community				-.020				.030
				(.038)				(.053)
Mean Killed				.238*				.206
				(.139)				(.132)
Pader District	-.048	-.051	-.055	-.034	.035	.035	.037	.028
	(.037)	(.039)	(.044)	(.041)	(.034)	(.037)	(.039)	(.034)
Constant	.536***	.516***	.558***	.308*	.813***	.813***	.925***	.743***
	(.146)	(.159)	(.193)	(.185)	(.134)	(.149)	(.196)	(.192)
No. of Observations	729	729	729	729	729	729	729	729
R^2	.003	.003	.008	.023	.003	.003	.012	.021

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are weighted by the camp population divided by the number of individuals sampled per camp. Diversity of camp residents is a dummy variable equal to one if most residents of the camp are from the immediate surrounding area (within 3 miles). Camp population is in tens of thousands of residents. Mean killed is the percentage of sample households by camp reporting having an immediate family member killed as a result of the insurgency. Road-local and road-community are types of roads providing access to the camp. The omitted category is federally-maintained road.

Table 2.10: Camp Age and Female Labour Market Participation: Never Moved Camp

	7 Days				30 Days			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Camp Age)	.005	-.037	-.028	.012	-.043	-.069	-.072	-.025
	(.057)	(.052)	(.055)	(.057)	(.060)	(.056)	(.056)	(.059)
HOUSEHOLD LEVEL CONTROLS								
Log(Months in Camp)		.064	.067	.068		.039	.043	.051
		(.054)	(.058)	(.058)		(.048)	(.052)	(.050)
Household Size			.006	.006			-.002	-.002
			(.012)	(.013)			(.012)	(.012)
Family Member Killed			-.038	-.036			-.002	-.0002
			(.049)	(.054)			(.054)	(.055)
Miles to Home			-.006	-.006			-.002	-.002
			(.007)	(.007)			(.006)	(.006)
Single-Headed			.016	.001			.002	-.009
			(.070)	(.075)			(.063)	(.066)
INDIVIDUAL LEVEL CONTROLS								
Age			-.001	-.001			-.002	-.003
			(.002)	(.002)			(.002)	(.002)
Literate			.030	.017			.021	.009
			(.058)	(.061)			(.047)	(.047)
CAMP LEVEL CONTROLS								
Diversity of Camp Residents				.022				.026
				(.042)				(.036)
Camp Population				.033**				.011
				(.013)				(.013)
Miles to Town				-.002				-.003
				(.003)				(.003)
Road - local				-.047				-.012
				(.036)				(.040)
Road - community				-.087*				.016
				(.053)				(.056)
Mean Killed				.211				.174
				(.174)				(.142)
Pader District	-.034	-.046	-.041	-.007	.071	.063	.070	.062
	(.043)	(.047)	(.051)	(.053)	(.048)	(.052)	(.055)	(.048)
Constant	.750***	.688***	.689***	.392*	.967***	.928***	1.034***	.791***
	(.194)	(.213)	(.258)	(.222)	(.195)	(.212)	(.261)	(.241)
No. of Observations	560	560	560	560	560	560	560	560
R^2	.001	.005	.013	.031	.006	.008	.017	.031

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are weighted by the camp population divided by the number of individuals sampled per camp. Diversity of camp residents is a dummy variable equal to one if most residents of the camp are from the immediate surrounding area (within 3 miles). Camp population is in tens of thousands of residents. Mean killed is the percentage of sample households by camp reporting having an immediate family member killed as a result of the insurgency. Road-local and road-community are types of roads providing access to the camp. The omitted category is federally-maintained road.

caused by displacement has meant a change in drinking habits: whereas men would previously often drink after a days work, many have now become accustomed to drinking instead of working"(p.33).

The identification of peer effects is complicated by their endogenous nature. In order to overcome this endogeneity, an instrumental variables approach is used here. I have argued in section 2.3.1 and demonstrated in table 2.5 that there was no self-selection into IDP camps based on observable characteristics of the individual, the IDP camp, or the IDP camp population. The measure of social interactions used here is at the IDP camp level. Therefore, it is likely that no self-selection into this social group exists. However, as termed by Manski (1993), the reflection problem does exist in this context. An individual's decision to participate in the labour market is taken at the same time as others in the same social group; i.e., decisions are made simultaneously. Therefore, it is impossible to identify endogenous peer effects from contextual effects, z_c, and from correlated effects, $\bar{x}_c$, in equations 2.2 and 2.3. λ in equation 2.3, is the coefficient of endogenous peer effects. An ordinary least squares estimation will not identify λ.

Therefore, I examine peer effects by studying the impact of the percentage of men working in the previous 30 days on the likelihood of participating in the labour market in the previous 7 days. The argument being that when a man makes the decision whether or not to work, he considers the male participation rate in the camp in which he lives in the recent past. This generates dynamics where the labour market participation rate amongst men slowly falls over time. The creation of an Internally Displaced People's camp and the movement of individuals into those camps generates a negative shock to labour market participation amongst men when compared to the pre-displacement situation. This feeds back into men's decisions to work in the next period, and this pattern continues as the labour market participation of men falls as the IDP camp ages.

However, given that the past 30 days includes the past 7 days, endogeneity issues remain. Therefore, peer effects are estimated using camp age as

an instrument for camp level employment for men, as in equation 2.2.

$$\bar{y}_c = \varphi + \theta \log(\text{camp age})_c + \tau \bar{x}_c + \rho z_c + v_c \tag{2.2}$$

where $\bar{x}_c$ is a vector of gender-specific means of individual and household variables at the camp level. z_c are camp characteristics which include the IDP camp population, its access to markets, and measures of insecurity at the camp level. Finally, $\bar{y}_c$ is the percentage of sample individuals per camp who reported working in the previous 30 days, differentiated by gender. These measures are consistent estimates of the population values at the camp level.

Camp age is defined as the number of months since the IDP camp's formation. A two stage least squares estimation strategy is used to identify λ in equation 2.3, the reduced form estimate of the measure of social interactions.

$$y_{ic} = \alpha + \beta x_{ic} + \delta \bar{x}_c + \gamma z_c + \lambda \bar{y}_c + u_{ic} \tag{2.3}$$

The estimation is performed separately for men and women and results are reported in tables 2.14 - 2.16. This estimation technique requires camp age to be a significant determinant of $\bar{y}_c$ and that it only affects y_{ic} through $\bar{y}_c$. The former is demonstrated in table 2.14, which reports first stage results for men. Although it is impossible to demonstrate that camp age only affects y_{ic} through $\bar{y}_c$, some evidence is provided below.

Section 2.3 demonstrates that camp age is uncorrelated with observable determinants of labour market participation. Moreover, the alternative explanation is that camp age is capturing labour market opportunities at the camp level. I argue that this is not the case. Firstly, in order for camp age to negatively affect male labour market participation and to have no effect, and if any, a positive effect, on female participation, the opportunities would have to differ by gender. I am not aware of a convincing explanation for why this would be the case. Furthermore, the variation in market access across camps is small. Where there is significant variation, it does not appear to be driven by the age of the IDP camp. Table 2.11 demonstrates that camp age is not a significant determinant of measures of camp level labour market

opportunities. Each row in column (1) of table 2.11 is an indirect measure of labour market opportunities. These opportunity measures are regressed on the log of camp age, while controlling for the district in which the camp is located. The regressions are at the camp level and demonstrate that camp age is not correlated with any observable measure of opportunities. Therefore, I conclude that there is no evidence that there are less labour market opportunities for men in older camps.

Table 2.12 presents the uninstrumented results for men. Social interactions are measured as the percentage of men in each IDP camp who have worked in the previous 30 days, excluding the individual of interest. Similar results are presented for women in table 2.13 where social interactions are measured similarly, using the percentage of women. The uninstrumented results for men differ significantly from the instrumented ones presented in table 2.16, providing evidence that this relationship in not simply a mechanical one.

The first stage results of equation 2.2 are presented in table 2.14 for men and table 2.15 for women. Table 2.14 shows the strong relationship between the percentage of men working in a camp and the camp's age. This relationship does not exist for women. Therefore, camp age is used as an instrument for social interactions for men in table 2.16. The coefficient on $\bar{y}_c$ is very significant and varies between 1.6 and 2.1, implying that individual labour market decisions move very closely with the male camp average. An increase in the percentage of men working in a camp of 10% increases the likelihood that a given man works by approximately 20%.

Finally, I have argued that it takes time for norms to diffuse throughout the IDP camp, including that of idleness. Therefore, I show that this is also the case for other norms, including beliefs commonly used to measure social capital. Women in the sample were asked whether they agreed or disagreed, and how strongly, with 22 statements regarding social capital. These questions are presented in Appendix A.4. A camp level coefficient of variation was created using the dispersion in women's responses to those questions. Given that it takes time for norms to diffuse throughout a population, the coefficient of variation should be negatively correlated with camp age, im-

Table 2.11: Camp Age and Labour Market Opportunities

	Log(Camp Age)	Pader
Camp Population	-.172	-.822
	(.588)	(.508)
Camp Density	-5.139	-.802
	(5.811)	(4.981)
Agricultural Produce Market in Camp (0/1)	-.156	-.237
	(.205)	(.182)
Miles to Nearest Agricultural Produce Market	9.422	13.554*
	(8.034)	(7.157)
Non-Agricultural Products Market in Camp (0/1)	-.227	-.201
	(.215)	(.191)
Miles to Nearest Non-Agricultural Products Market	11.615	9.379
	(7.610)	(6.780)
Farm Inputs Market in Camp (0/1)	-.201	-.354**
	(.189)	(.169)
Miles to Nearest Farm Inputs Market	8.352	20.173***
	(8.695)	(7.747)
Number of Soldiers per Camp Population	.0008	.026***
	(.012)	(.009)
Camp Ever Attacked (0/1)	.196	.054
	(.214)	(.185)
Type of Road Accessing the Camp	-.535	.444
	(.375)	(.324)
Average Miles Home	.943	-.103
	(.585)	(.506)
Miles to Nearest IDP Camp	-1.019	2.511***
	(.991)	(.856)
Miles to Nearest Credit/Lending Institution	4.606	1.033
	(6.695)	(5.859)
Percentage of Household Heads Literate	-.075	-.025
	(.047)	(.041)

Notes: Standard errors are in parentheses. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are at the camp level. Each row represents a separate regression. Camp population and camp density are in tens of thousands of residents. The type of road accessing the camp takes the value of 1 if the road is a locally-maintained road, a value of 2 if it is a community-maintained road, and a value of 3 if it is a federally-maintained road. In general, the quality of the road is improving as the value of this variable increases.

Table 2.12: Uninstrumented Social Interactions and Male Labour Market Participation

	(1)	(2)	(3)	(4)
Camp Level Male Labour	.616**	.526**	.486**	.274
Market Participation ($\bar{y}_c$)	(.251)	(.227)	(.207)	(.283)
HOUSEHOLD LEVEL CONTROLS				
Log(Months in Camp)		-.088**	-.084*	-.045
		(.044)	(.044)	(.032)
Household Size			.029**	.023***
			(.012)	(.008)
Miles to Home			-.002	-.001
			(.006)	(.007)
Family Member Killed			.093***	.123***
			(.034)	(.039)
INDIVIDUAL LEVEL CONTROLS				
Age			-.004*	-.003
			(.002)	(.002)
Literate			.098	.110*
			(.061)	(.065)
CAMP LEVEL CONTROLS				
Diversity of Camp Residents				.099
				(.072)
Camp Population				-.006
				(.020)
Miles to Town				.002
				(.003)
Road - local				-.068
				(.058)
Road - community				-.111
				(.074)
Mean Killed				-.624*
				(.326)
Pader District	-.001	.038	.029	.046
	(.067)	(.076)	(.068)	(.064)
Constant	.230	.583***	.447	.846***
	(.241)	(.224)	(.275)	(.321)
No. of Observations	612	612	612	612
R^2	.018	.027	.071	.102

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are weighted by the camp population divided by the number of individuals sampled per camp. Diversity of camp residents is a dummy variable equal to one if most residents of the camp are from the immediate surrounding area (within 3 miles). Camp population is in tens of thousands of residents. Mean killed is the percentage of sample households by camp reporting having an immediate family member killed as a result of the insurgency. Road-local and road-community are types of roads providing access to the camp. The omitted category is federally-maintained road.

Table 2.13: Uninstrumented Social Interactions and Female Labour Market Participation

	(1)	(2)	(3)	(4)
Camp Level Female Labour	-.243	-.252	-.241	-.563
Market Participation ($\bar{y}_c$)	(.610)	(.637)	(.619)	(.549)
HOUSEHOLD LEVEL CONTROLS				
Log(Months in Camp)		.040	.042	.042
		(.046)	(.049)	(.043)
Household Size			-.002	.0002
			(.009)	(.010)
Miles to Home			-.002	-.002
			(.005)	(.005)
Family Member Killed			-.031	-.031
			(.046)	(.048)
Single-Headed			-.046	-.049
			(.046)	(.047)
INDIVIDUAL LEVEL CONTROLS				
Age			-.0006	-.0007
			(.001)	(.001)
Literate			-.008	-.017
			(.045)	(.047)
CAMP LEVEL CONTROLS				
Diversity of Camp Residents				-.022
				(.036)
Camp Population				.037***
				(.014)
Miles to Town				-.005
				(.003)
Road - local				.016
				(.045)
Road - community				.002
				(.065)
Mean Killed				.381*
				(.220)
Pader District	-.010	-.029	-.030	.015
	(.030)	(.032)	(.038)	(.052)
Constant	.956*	.838*	.892*	.917**
	(.530)	(.469)	(.456)	(.404)
No. of Observations	729	729	729	729
R^2	.002	.004	.008	.028

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are weighted by the camp population divided by the number of individuals sampled per camp. Diversity of camp residents is a dummy variable equal to one if most residents of the camp are from the immediate surrounding area (within 3 miles). Camp population is in tens of thousands of residents. Mean killed is the percentage of sample households by camp reporting having an immediate family member killed as a result of the insurgency. Road-local and road-community are types of roads providing access to the camp. The omitted category is federally-maintained road.

Table 2.14: Male First Stage Results

	Camp Level Male Labour Market Participation $\bar{y}_c$			
	(1)	(2)	(3)	(4)
Log(Camp Age)	-.138***	-.146***	-.145***	-.123**
	(.050)	(.050)	(.050)	(.051)
HOUSEHOLD LEVEL CONTROLS				
Log(Months in Camp)		.011	.011	.015*
		(.011)	(.011)	(.008)
Household Size			-.0002	-.0003
			(.003)	(.001)
Miles to Home			.0006	.002
			(.002)	(.001)
Family Member Killed			-.015	-.012
			(.011)	(.008)
INDIVIDUAL LEVEL CONTROLS				
Age			-.0002	.0001
			(.0004)	(.0001)
Literate			.016	.004
			(.013)	(.010)
CAMP LEVEL CONTROLS				
Diversity of Camp Residents				.008
				(.030)
Camp Population				-.002
				(.010)
Miles to Market				.0003
				(.002)
Road - local				-.013
				(.034)
Road - community				-.042
				(.070)
Mean Killed				-.156
				(.133)
Mean Age				-.011*
				(.006)
Mean Household Size				-.041
				(.037)
Mean Literate				.414***
				(.144)
Pader District	.022	.020	.019	.033
	(.034)	(.034)	(.032)	(.029)
Constant	1.292***	1.284***	1.282***	1.671***
	(.167)	(.167)	(.172)	(.425)
No. of Observations	612	612	612	612
R^2	.269	.271	.283	.437
F	7.750	8.661	8.323	5.874

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are weighted by the camp population divided by the number of individuals sampled per camp. Diversity of camp residents is a dummy variable equal to one if most residents of the camp are from the immediate surrounding area (within 3 miles). Camp population is in tens of thousands of residents. Mean killed is the percentage of sample households by camp reporting having an immediate family member killed as a result of the insurgency. Road-local and road-community are types of roads providing access to the camp. The omitted category is federally-maintained road.

Table 2.15: Female First Stage Results

	Camp Level Female Labour Market Participation $\bar{y}_c$			
	(1)	(2)	(3)	(4)
Log(Camp Age)	.018	.019	.018	.027
	(.028)	(.028)	(.027)	(.031)
HOUSEHOLD LEVEL CONTROLS				
Log(Months in Camp)		-.002	-.004	-.004
		(.009)	(.009)	(.007)
Household Size			.0001	.0001
			(.001)	(.0007)
Miles to Home			.0005	.00004
			(.0007)	(.0006)
Family Member Killed			.009	.004
			(.008)	(.003)
Single-Headed			-.013	-.011*
			(.008)	(.006)
INDIVIDUAL LEVEL CONTROLS				
Age			.0006**	.0001
			(.0002)	(.0002)
Literate			.012	.005
			(.013)	(.006)
CAMP LEVEL CONTROLS				
Diversity of Camp Residents				-.006
				(.023)
Camp Population				.010
				(.009)
Miles to Town				-.003
				(.002)
Road - local				.016
				(.030)
Road - community				.057
				(.043)
Mean Killed				.219
				(.141)
Mean Age				.010*
				(.005)
Mean Household Size				.029
				(.024)
Mean Literate				-.085
				(.113)
Pader District	.020	.020	.023	.009
	(.030)	(.030)	(.030)	(.029)
Constant	.775***	.777***	.757***	.120
	(.089)	(.092)	(.082)	(.312)
No. of Observations	729	729	729	729
R^2	.043	.043	.061	.338
F	.4233	.4935	.4449	.6846

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are weighted by the camp population divided by the number of individuals sampled per camp. Diversity of camp residents is a dummy variable equal to one if most residents of the camp are from the immediate surrounding area (within 3 miles). Camp population is in tens of thousands of residents. Mean killed is the percentage of sample households by camp reporting having an immediate family member killed as a result of the insurgency. Road-local and road-community are types of roads providing access to the camp. The omitted category is federally-maintained road.

Table 2.16: Social Interactions and Male Labour Market Participation

	(1)	(2)	(3)	(4)
Camp Level Male Labour	2.125***	1.961***	1.868***	1.620***
Market Participation ($\bar{y}_c$)	(.697)	(.631)	(.568)	(.358)
HOUSEHOLD LEVEL CONTROLS				
Log(Months in Camp)		-.031	-.031	-.018
		(.028)	(.030)	(.029)
Household Size			.027***	.020**
			(.009)	(.008)
Miles to Home			-.0009	-.002
			(.006)	(.006)
Family Member Killed			.120***	.141***
			(.043)	(.045)
INDIVIDUAL LEVEL CONTROLS				
Age			-.003	-.003
			(.002)	(.002)
Literate			.072	.085
			(.058)	(.060)
CAMP LEVEL CONTROLS				
Diversity of Camp Residents				.046
				(.040)
Camp Population				.003
				(.013)
Miles to Town				.002
				(.002)
Road - local				-.016
				(.040)
Road - community				-.063
				(.049)
Mean Killed				-.367**
				(.169)
Mean Age				.010
				(.007)
Mean Household Size				.073
				(.047)
Mean Literate				-.229
				(.180)
Pader District	.064	.072	.061	.060
	(.053)	(.055)	(.050)	(.038)
Constant	-1.015*	-.781	-.860	-1.180*
	(.590)	(.528)	(.561)	(.716)
No. of Observations	612	612	612	612

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are weighted by the camp population divided by the number of individuals sampled per camp. Diversity of camp residents is a dummy variable equal to one if most residents of the camp are from the immediate surrounding area (within 3 miles). Camp population is in tens of thousands of residents. Mean killed is the percentage of sample households by camp reporting having an immediate family member killed as a result of the insurgency. Road-local and road-community are types of roads providing access to the camp. The omitted category is federally-maintained road. The instrument is the log of camp age, measured in months.

plying that women's responses vary less in older IDP camps, and indeed this is the case. The correlation between camp age and the coefficient of variation is -0.2987 and camp age is a significant determinant of the camp coefficient of variation. The estimated coefficient of the log of camp age is -0.007 and significant at the 10 percent level[10], where the mean of the coefficient of variation is 0.092.

2.5 Conclusion

This chapter provides evidence of the impacts of conflict-induced displacement on labour market participation. The random nature of the conflict and subsequent displacement in Northern Uganda is exploited to identify causal impacts. The findings suggest significant differences in the responses to displacement by men and women. I find a strong negative impact of prolonged displacement, as measured by camp age, on the labour market participation decisions of men. Women's labour market participation is not influenced by the age of the IDP camp in which they live. The mechanism through which camp age influences behaviour is investigated using an instrumental variables approach.

I argue that camp age is capturing social interactions in labour market participation. The rationale is that the older the IDP camp, the more time has passed for a culture of idleness amongst men to develop in that camp. The formation of an IDP camp leads to the formation of negative social capital amongst men. A similar culture has not developed among women.

The findings of the instrumental variables estimation suggest that social interactions are important determinants of male labour market participation. A one percent increase in the average participation rate of men working in a camp increases the individual probability of male labour market participation by between 1.6 and 2.1%. This finding suggests the possibility for large multiplier effects of interventions seeking to increase labour force participation in displaced people's camps.

[10]The estimated coefficient is -0.008 when the district is included in the regression and is significant at the 10 percent level.

Furthermore, the length of time of an IDP camp's existence has a strong negative impact on male labour force participation. Research has suggested that male idleness and lack of income has led to a high level of male drunkenness, disorder, and domestic violence ((Bøäs and Hatløy, 2005, p.15)). Therefore, the length of time of an IDP camp's existence should be minimized while taking into consideration security and resettlement issues. Furthermore, programs geared at employing men while displaced may have a significant impact on the culture of work that develops in a camp.

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Chapter 3

The Impact of Food for Education Programs on School Participation in Northern Uganda[1]

3.1 Introduction

The Millennium Development Goal of Universal Primary Education is one that has attracted considerable interest, in part because it can be addressed, at least nominally, directly through education policy. Many developing country governments have moved to eliminate primary school fees and institute a policy of Universal Primary Education in the past decade. Although these policies have increased officially documented enrollment rates, progress in improving primary school attendance has been limited. This pattern has led donors and governments to consider complementary programs to further improve primary school participation. In this context, food for education programs have received renewed attention.

Food for education programs are generally considered to be effective at increasing school participation. A large body of research supports this view, though estimates of the size of the effect differ considerably by context. Important factors affecting the magnitude of the impacts include initial attendance rates, school quality, and the food transfer size (Ahmed (2004),

[1]A version of this chapter will be submitted for publication. Alderman, H., Gilligan, D.O., and Lehrer, K. The Impact of Food for Education Programs on School Participation in Northern Uganda.

Vermeersch and Kremer (2004), Jacoby et al. (1996), Powell et al. (1998)). Moreover, the evidence from many studies is limited because the effect is measured only for children already in school, the research design is not causal, or the sample is not representative of school-age children (Adelman et al. (2008)). As a result, it can be difficult for policy makers to anticipate the size of the increase in school enrollment and attendance that will occur in response to a new FFE program.

The ambiguity regarding FFE increases in school participation weakens support for new food for education initiatives because these programs can be relatively expensive to operate. At a cost of $28-$63 USD per child per year (Bundy et al. (2009)p.60), their cost almost rivals the cost of education itself in some developing countries. If raising school participation is the only goal of a FFE program, research suggests that other programs, such as deworming, free school uniforms, parent-teacher partnerships, and programs improving teacher incentives may be more cost-effective (Miguel and Kremer (2004), Tan et al. (1999)). The impacts of these programs on school participation may not be as large as from a FFE program, but these alternatives are significantly cheaper to operate. However, when food for education programs provide nutritious food to undernourished pupils, they can reduce short-term hunger and help improve pupils' learning and cognitive development (Adelman et al. (2008)). In order to understand the full impacts of FFE programs, it is first necessary to obtain reliable estimates of their impacts on school participation.

This study presents rigorous evidence of the impact of two food for education programs operated by the World Food Programme on primary school participation in Northern Uganda. Using a prospective, cluster randomized, controlled field experiment carried out from 2005-2007, we obtain causal estimates of the impact of the programs on measures of primary school enrollment, school attendance, age at school entry, grade promotion, and progression to secondary school for a random sample of school-age children living in the service area of the schools. The household sample for this study is drawn from clusters identified by the boundaries of Internally Displaced People's camps in Pader and Lira districts in Northern Uganda. These IDP

camps represent well-defined service areas for the primary schools they contain.

The two food for education programs of interest are an in-school meals program and a take-home rations program conditional on school attendance. This further expands the contribution of this research by enabling an investigation into how differences between these two delivery methods of food for education programs determine their impacts on school participation. Moreover, to our knowledge, there are only two studies that investigate the impacts of take-home rations programs. Kazianga et al. (2008) find a 6 percent increase in girls' enrollment from a take-home rations program in Burkina Faso. It is important to note that in their study the baseline enrollment is extremely low, at approximately 27 percent for all school-age children. Ahmed and del Ninno (2002) provide evidence of the impact of a THR program provided to poor households in rural Bangladesh. They show that the program had fairly significant impacts on school participation, including an eight percent increase in primary school enrollment and a 12 percent increase in school attendance recorded during unannounced attendance visits.

By directly comparing SFP and THR programs operating in the same context in Northern Uganda, this study helps to explain which components of FFE programs are most vital to improving school participation. These program components, such as, the timing and location of the meals and control over the transfer by other household members, have rarely been systematically altered in order to study their contribution to FFE objectives. Take-home rations conditional on school attendance provide an informative counterfactual to an SFP program by substituting for meals provided at school and during the school day with a monthly dry food ration provided at home. This comparison allows the investigation of whether providing meals at school to hungry children is uniquely effective at attracting them to school day after day.

In particular, this study considers how the difference in the timing of meals inherent in the two modalities affects their impacts. Although it is possible for children receiving take-home rations to bring food with them to school or, in some cases, return home for lunch, it is more difficult and costly

for the pupil and the household than receiving a meal at school. In practice, THR beneficiaries rarely supplied their own lunch in Northern Uganda. As a result, children receiving take-home rations had systematically different timing of access to the food during the day than their counterparts in SFP schools.

Moreover, the monthly rations from the THR program were under the control of the beneficiary child's caregivers. These caregivers were free to use the food as they saw fit, including redistributing it to other household members or selling it. One effect of this difference in modality is that under a THR program, parents rather than school children have the incentive for the child to attend school. The attendance of pupils enrolled in THR beneficiary schools was monitored and rations could be terminated if the child did not attend at least 85 percent of school days. Moreover, it is easier to redistribute some of the food to other household members with take-home rations. This further dilutes the child's incentive to attend school and reduces the physiological and nutrition benefits that make attending easier through reduced morbidity and improved attention span.

We find positive impacts of both FFE programs on school participation measures. The results show positive impacts of the in-school meals program on primary school enrollment when we restrict the analysis to children who were not enrolled before the introduction of the FFE programs. Moreover, based on the results from unannounced attendance data, we find significant positive impacts of both in-school meals and take-home rations on morning and afternoon attendance. The results also show a weakly significant impact of both FFE programs on age at entry to primary school and a reduction in grade repetition from the SFP program for boys, but the SFP impact is not statistically different from the THR program. Finally, we find no impact of either program on progression to secondary school. However, children in grades 6 or 7 in school feeding program schools in 2005 were significantly more likely to remain in primary school as of 2007. This suggests that school meals may have the unintended effect of increasing the time taken to complete primary school.

The remainder of the chapter is organized as follows. Section 3.2 de-

scribes how SFP and THR programs impact school participation. Section 3.3 describes the empirical strategy, outlining the details of the randomization of the two programs in order to identify the main program effects. Section 3.4 refers the reader to the appropriate sections in chapter 2 that describe the study setting in Northern Uganda, the details of the design and operation of the school feeding programs, and the evaluation study data. Section 3.5 provides the main empirical results and section 3.6 concludes.

3.2 The Conceptual Framework

Food for education programs, such as SFP and THR programs, improve school participation by decreasing the net cost of sending children to school. For a given school year, parents decide to enroll their children in school if the expected effect on the child's future earnings exceeds the net cost of having the child enrolled for that year. This cost includes the direct cost of school enrollment, including school fees, uniforms, and school supplies. The other cost component is the opportunity cost of schooling, including the loss of the child's income, agricultural labour for the household, and household labour. The net cost of school participation is the sum of these direct costs and the opportunity costs minus any direct benefit from school participation, including transfers from a FFE program. The decision regarding a child's school attendance is similar. Parents will send a child to school in a given week or on a given day if the benefits to having the child at home working, caring for siblings, or recovering from an illness is outweighed by the cost of lost time learning, missed school meals, or the potential to lose the next month of take-home rations.

The factors that determine these school participation decisions are often different for boys and girls and vary with child age, particularly in terms of the child's expected contribution to household income, farm labour, caring for siblings and sick relatives, and other household chores, such as, fetching water or firewood. Children also have different susceptibility to infection, a major cause of missed school days in developing countries. Furthermore, the quality of the school affects the participation decision by changing the ex-

pected benefits of schooling in terms of learning and future earnings. Parents are often unmotivated to send children to school if they believe the education is of little value. Factors affecting school quality include teacher training, ability, and attendance, the physical school infrastructure, the availability of school supplies, such as, textbooks and chalkboards, and the pupil/teacher ratio.

The effect of the two FFE modalities on the school participation decision may also differ in terms of the timing of meals and the control of the transfers. If providing meals during the school day has important effects on a child's school performance, an in-school meals program may have a larger effect on school attendance than take-home rations. Alternatively, if the nutritional effect of the food transfers on school performance comes in terms of overall nutrition, so that children are able to smooth the benefits of the additional food consumption over a 24-hour period, then the effect of SFP and THR programs on school attendance will not differ in this regard.

The control over the food transfers from SFP and THR programs by the child or caregiver may have substantial effects on school participation decisions. These effects derive from differences in the strength of incentives to attend school and from the amount of additional food the school-age child receives. Meals served at school provide a direct incentive to a child to attend, particularly if that child is hungry and the food is substantial. This suggests that school quality may have less of an effect on school attendance in SFP schools than THR schools because the child is motivated to attend by the meals, regardless of the effect on learning. In a THR program, the food ration is generally controlled by someone other than the child, who receives the direct incentive to send the child to school. If the transfer is important to the parent or caregiver, as additional income or as a source of nutrition for the school-age child or a younger sibling, for example, the parent will send the child to school. In this sense, differences in the importance of the food from the FFE program between the child and the caregiver may affect the relative strength of incentives for attendance in the SFP and THR modalities.

These program-based differences in control over the food transfers also

affect which household members receive the additional nutrition provided by the program. Though the beneficiary child in an in-school meals program consumes all of the food transfer at school, parents may rationally respond by redistributing some food away from that child to other household members at other meals. Jacoby (2002) termed the amount of the food transfer that 'sticks' to the child in terms of increased food consumption as the intrahousehold 'flypaper effect'. Though researchers and managers of school feeding programs have often expressed concern that the flypaper effect may be small, Jacoby showed that children in an SFP program in the Philippines received a substantial fraction of the additional food provided by the SFP transfers. In a THR program, the potential for small flypaper effects is even greater because it is easier for parents to redistribute the food to other household members. This redistribution may be well justified because the benefits of the additional nutrition to a child under age two or to a sick family member may be much greater than to the school-age child. There is currently no evidence on the relative size of this flypaper effect between SFP and THR programs.

Another important difference in the way that SFP and THR programs can affect learning, and so school participation, is through the interruption of learning activities in SFP schools while meals are being prepared and served. Organizing and conducting school meals can be time consuming and disruptive, particularly in large schools or with programs that provide more than one meal during the school day.

The differences in FFE modalities can also affect other schooling outcomes, including child age at school entry and education attainment, as measured by grade promotion and progression to secondary school. The effect of both SFP and THR programs on a child's age at entry to primary school is similar to the general effects on school enrollment and attendance, increasing the benefits of school enrollment for younger children through an income effect. The effect of these alternative FFE modalities on grade promotion and progression to secondary school operates through their effects on improved attendance, school performance, and reduced morbidity. A child is more likely to successfully complete a grade and continue to the

next if the child has attended school regularly and performed well on exams. Thus, many of the factors that determine how SFP and THR programs affect school participation are also relevant to these programs' effects on grade promotion and progression to secondary school. However, school performance is an important determinant of these promotion outcomes, so differences in the effects of SFP and THR programs on a pupil's concentration in the classroom or food-based biological changes that affect cognitive development may be important. Many of these differences in effects derive from differences in the timing of meals and from the fraction of the food transfer that the child receives under the two delivery methods.

There are two common differences in SFP and THR modalities that often induce different impacts on education outcomes that are not present in the program analyzed in this study but should nonetheless be mentioned briefly. They are the size of transfer provided and the way the programs are targeted within schools. Most THR programs run by the World Food Programme, for example, are targeted within schools to groups with low education outcomes, particularly to girls in some countries or to extremely poor households. THR programs are more easily targeted than in-school meals because they are less public and require only monthly transfers that attract less attention and fewer claims of unfairness or exclusion. On the other hand, most in-school meals programs in developing countries are targeted at the school level, with all children at program schools receiving meals. The ease of targeting children within schools is a strength of the THR modality that can boost its cost effectiveness, particularly regarding school participation. Typically, a large share of food transfers in school feeding programs goes to children who were already enrolled with very high attendance rates.

The other common difference in the two programs is the amount and type of food provided under each modality. In-school meals often include milk products or other nutrient-dense foods while take-home rations typically include cereals and oils, which may or may not be fortified. In-schools meals program often provide more food and food of higher nutritional quality than take-home rations. The benefits of the programs may differ for this reason alone. Therefore, the programs in Northern Uganda were created so that a

child who attended school every day and received in-school meals received the same amount and quality of food as a pupil who attended the minimum required days in at THR school.

3.3 The Empirical Strategy

3.3.1 The Identification Strategy

The evaluation uses an experimental, randomized, prospective design. A prospective study collects data before the interventions begin and after a period of implementation. This makes it possible to control for pre-program child and household characteristics and to observe changes in outcome variables during the interventions. The experimental design was achieved by randomly assigning the similarly eligible IDP camps, which serve as the catchment area for primary schools in most cases, to the treatment groups (SFP, THR, and control).

The random assignment of IDP camps into treatment groups makes it possible to place a causal interpretation on estimated impacts (Heckman and Smith (1995)). The intuition is that if access to the program is random within a group of similarly eligible IDP camps, treatment status cannot be correlated with the outcomes. As a result, any observed differences in average outcomes over time between the treatment groups and the control group must be a result of the program. When access to the program is not random, measures of program impact based on a comparison of mean outcomes between program beneficiaries and a non-experimental comparison group may be biased due to selection effects. Selection effects are caused by unobserved characteristics of the IDP camps, households, or individuals that are correlated with the outcomes of interest and with the probability of receiving the intervention. Typically there are two causes of selection effects; targeting of the program to communities based on factors affecting the outcome, and actions by the community, the household, or the individual that affect participation in the program, either through lobbying the government or the organization providing the treatment, or through the household's or

individual's decision to participate.

Random assignment of IDP camps to the interventions eliminates potential bias from program targeting or lobbying, but bias from sampling error or from household selection effects may still exist. Sampling error arises when, by chance, there are differences in mean pre-program outcomes or relevant household or individual characteristics between the treatment and control group after the randomization. In a large sample of IDP camps sampling error would be small, but in moderate sized samples some sampling error may exist. This can be checked by testing for the equality of mean outcomes in the baseline sample. Gilligan et al. (2006) present such tests on the 2005 baseline survey data for various outcomes and household characteristics, including household demographics, education, child anthropometry, morbidity, and iron status. Most tests fail to reject the equality of means of these variables between the treatment groups, though small significant differences were found for some measures of school attendance and learning. A summary of these results are reported in table 3.1.

If the randomization is effective and sampling error is not of concern, the impact of the program on outcome, Y, can be measured by the average difference in outcomes between the treatment group, T, and the comparison group, C, after implementation as in equation 3.1,

$$\Delta^{SD} = E[Y_1^T - Y_1^C] \tag{3.1}$$

where the subscript 1 refers to the period after program implementation. This is sometimes referred to as a 'single difference' (SD) estimator of program impact, since it compares only post-program outcomes. If the presence of sampling error leads to differences in outcomes by treatment group before the program (period 0), unbiased impacts can be calculated using a treatment group 'difference-in-difference' (DID) impact estimate. This is calculated as the average 'before-and-after' change in the outcome for individuals in an intervention group minus the comparable average change in the outcome for the control group (or alternative treatment group) as in

Table 3.1: Comparison of Baseline Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
Variable	SFP	THR	Control	SFP=Control	THR=Control	SFP=THR
Individual Outcomes (Age 6-13)						
Enrollment						
Net	0.866	0.861	0.806	0.122	0.188	0.820
	(0.013)	(0.020)	(0.035)			
Gross	0.887	0.883	0.836	0.119	0.191	0.832
	(0.010)	(0.018)	(0.030)			
Attendance	0.950	0.905	0.862	0.026**	0.388	0.217
	(0.009)	(0.034)	(0.037)			
Test Scores						
Lower Primary Numeracy	42.613	44.145	50.022	0.095*	0.246	0.749
	(2.790)	(3.701)	(3.137)			
Upper Primary Numeracy	44.435	36.813	32.077	0.070*	0.573	0.274
	(3.410)	(5.674)	(5.286)			
Lower Primary Literacy	26.306	31.889	28.902	0.589	0.671	0.487
	(3.699)	(6.195)	(2.658)			
Upper Primary Literacy	11.880	10.000	14.154	0.686	0.536	0.692
	(2.426)	(3.969)	(4.941)			
Age at Entry	7.086	6.997	7.126	0.786	0.362	0.434
	(0.083)	(0.076)	(0.117)			
Grades Repeated	0.500	0.549	0.444	0.454	0.147	0.406
	(0.043)	(0.039)	(0.059)			
Individual Characteristics (Age 6-13)						
Age	9.381	9.233	9.269	0.407	0.809	0.182
	(0.065)	(0.086)	(0.117)			
Orphan Status	0.140	0.104	0.097	0.148	0.827	0.269
	(0.022)	(0.023)	(0.021)			
Class level	2.668	2.563	2.550	0.356	0.914	0.259
	(0.063)	(0.064)	(0.102)			
Household Characteristics						
Household Size	6.662	6.442	6.606	0.796	0.338	0.186
	(0.145)	(0.067)	(0.155)			
Literacy Status						
Mother	0.333	0.345	0.370	0.665	0.770	0.864
	(0.049)	(0.047)	(0.066)			
Father	0.833	0.768	0.780	0.257	0.838	0.219
	(0.024)	(0.045)	(0.039)			
Agricultural Land	7.955	9.415	8.710	0.634	0.723	0.468
(acres)	(1.040)	(1.534)	(1.032)			

Notes: Columns (1)-(3) report the means of the variables of interest by treatment status. Columns (4)-(6) report p-values for a t-test of the equality of means across treatment groups. Linearized standard errors are reported in parentheses. Standard errors are stratified at the district level and clustered at the camp level. Attendance is self-reported attendance in the previous 7 days as a proportion of days the school was open. An orphan is defined as a child whose biological parents are no longer alive. Literacy status is a dummy variable for whether the individual is literate. Agricultural land is the number of acres the household owned prior to being displaced.

equation 3.2.

$$\Delta^{DID} = E[(Y_1^T - Y_0^T) - (Y_1^C - Y_0^C)] \tag{3.2}$$

In the impact estimates constructed here, a child's treatment status is determined by age and by the treatment assignment of the IDP camp in which they reside. This measure of program impact represents the effect of offering access to the program, rather than the effect of participation in the program (Burtless (1995)). The effect of participation in a program is harder to measure because program managers can usually control access to the program, but once the program is available, households control the decision to participate. In the evaluation literature, measures of the impact of access to a program are referred to as 'intent-to-treat' impact estimates.

In impact analysis, it is often important to control for other factors that may affect program impacts even in randomized experiments. This occurs when there are systematic differences in household or individual pre-program characteristics that may affect program outcomes, even if there is no difference in average pre-program outcomes themselves. In this case, controlling for the effect of these pre-program characteristics in the analysis may be justified and can improve the precision of the impact estimates. In these cases, impacts can be estimated conditional on a vector of pre-treatment characteristics, X, as in equation 3.3.

$$\Delta^{DID} = E[(Y_1^T - Y_0^T) - (Y_1^C - Y_0^C)|X] \tag{3.3}$$

3.3.2 The Econometric Specification

Regression analysis was used to estimate the impact of the SFP and THR programs. We denote access to the SFP program by T_1 and T_2 represents access to the THR program. The single difference impact of the programs in equation 3.1 can be estimated as

$$Y_{ic1} = \beta_0 + \beta_1 T_1 + \beta_2 T_2 + \epsilon_{ic} \tag{3.4}$$

where Y_{ic1} is the outcome of interest of child i in IDP camp c in period 1, after the implementation of the programs. T_1 is a dummy variable representing access to the SFP treatment and takes a value of 1 if the child resides in an IDP camp randomized into the SFP treatment, and zero otherwise. Similarly, T_2 is a dummy variable representing access to the THR treatment. ϵ_{ic} is the unobserved child and camp specific error term. We allow for correlation in the error structure within district and IDP camp by stratifying at the district level and clustering at the IDP camp level.

If the randomization was effective, leading to no differences in mean outcomes before the programs, estimating equation 3.4 on outcomes measured after the programs have been implemented provides a well-identified estimate of the impact of access to the SFP program, β_1, and of access to the THR program, β_2.

If pre-program data on outcomes are available, and particularly if sampling error results in differences in these outcomes before the programs, DID estimates in equation 3.2 can be obtained by estimating

$$Y_{ict} = \beta_0 + \beta_1 T_1 + \beta_2 T_2 + \beta_3 R_1 + \beta_4 T_1 R_1 + \beta_5 T_2 R_1 + \epsilon_{ict} \tag{3.5}$$

where R_1 is a dummy variable that takes on the value of 1 if the observation is from period 1, and zero otherwise. t indexes the time period with 0 representing the baseline and 1 representing the post-implementation period.

In equation 3.5, β_4 is the DID estimate of the impact of access to the SFP program on the change in the outcome before and after the program began and β_5 is the DID estimate of the impact of access to the THR program on the change in the outcome. Conditional impact estimates such as those in equation 3.3 can be obtained by adding a vector X of control variables to equation 3.5.

3.4 The Setting

The randomized food for education experiment analyzed in this chapter was conducted in Northern Uganda during a time of conflict and dis-

placement. This setting is described in section 1.3. The experiment was conducted in 31 IDP camps in two districts in Northern Uganda. The randomization and sample selection are discussed in section 1.4. Furthermore, section 1.4 describes the two food for education interventions; the in-school meals program and the take-home rations program. It also details the data collection and survey instruments, including the outcomes of interest in this chapter, the measures of school participation.

3.5 Results

The analysis of the impact of the SFP and THR programs on school participation focuses on primary school enrollment, attendance, age at entry, grade repetition, and progression to secondary school. Table 3.2 lists the outcome variables examined, the variable definition, the data source from which the variable was constructed, and the sample mean of the outcome prior to the implementation of either program.

3.5.1 Enrollment

Impacts on enrollment are examined using two standard measures of school enrollment, gross primary school enrollment and net primary school enrollment. Gross enrollment is the proportion of all children enrolled in primary school to the number of 6-13 year olds in the service area of the primary school. This proportion can be greater than one because delayed or early school entry, gaps in schooling, and grade repetition leave many children enrolled in primary school beyond age 13; the expected age of primary school completion. Net enrollment is the proportion of 6-13 year old children enrolled in primary school to the number of 6-13 year olds in the service area of the school. We also extend our analysis to focus on the enrollment of younger children, who were more likely to have been affected by the introduction of the FFE programs.

The implementation of Universal Primary Education in Uganda in 2002 abolished all overt primary school fees, and established a school funding

Table 3.2: School Participation Outcome Variables

Outcome Variable	Definition	Data Source	Baseline Mean
Gross enrollment	Ratio of children of any age enrolled in primary school to primary school age children (aged 6-13)	Household survey	0.880 (0.011)
Net enrollment	Ratio of children aged 6-13 enrolled in primary school to all children aged 6-13	Household survey	0.849 (0.013)
Net daily attendance (morning and afternoon)	1 if child was found in school, 0 if child was absent or not enrolled (children aged 6-17 in the baseline)	Unannounced attendance visits	N/A
Net attendance in past 7 days (conditional on enrollment)	Share of school days in the past 7 days that an enrolled 6-13 year old child attended school	Household survey	0.914 (0.016)
Age at entry to primary school	Age (in completed years) when child first enrolled in primary school	Household survey	7.068 (0.053)
Grade repetition	The number of grades repeated (2005-2007)	Household survey	N/A
Progression to secondary	Whether a child in grade 6 in 2005 enrolled in secondary in 2007	Household survey	N/A
Remaining in primary	Whether a child in grade 6 or 7 in 2005 remained enrolled in primary in 2007	Household survey	N/A

Notes: Linearized standard errors in parentheses are stratified at the district level and clustered at the camp level.

formula based on the number of enrolled students. With this policy in place, it is unsurprising that baseline enrollment levels in the sample are high. The baseline net enrollment rate in the sample is 84.9 percent, while the gross enrollment rate is 88.0 percent.

The estimated difference-in-difference impacts of the SFP and THR programs on net and gross enrollment are presented in table 3.3. We find no impacts of either program on either measure of enrollment. Furthermore, no impacts were found on net enrollment of 6-9 year olds (column 3), who may have been more likely to respond to the enrollment incentives provided by the FFE programs. Table 3.4 presents results from child fixed effects estimation, which controls for unobserved child level effects. Controlling for child fixed effects does not meaningfully change the results on net and gross enrollment for 6-13 year olds or on the net enrollment of 6-9 year olds. In table 3.5, we restrict the sample to children who were not enrolled in primary school in the baseline. Given the baseline dependent variable for this entire subsample takes a value of zero, the estimates presented in table 3.5 are single difference estimates and not difference-in-difference estimates. As demonstrated in table 3.1, there are no significant differences in baseline enrollment across treatment groups. Column (1) reports results unconditional on age. Again, we find no significant impacts of either program on enrollment. However, in columns (2) and (3), we restrict the sample to children who, according to Ugandan government recommendations, should have been enrolled at baseline, those who were age 6-9 at baseline in column (2) and those aged 6-13 in column (3). Here, we find a significant positive impact of the SFP program on enrollment. The estimates indicate that providing meals at school lead to a 9 percent increase in the probability that a child, who was not enrolled at baseline, would enroll in primary school by 2007. However, the estimated impact of the in-school meals program was not significantly different than the THR program.

FFE programs lead to greater investments in education primarily by subsidizing schooling costs. The SFP and THR modalities differ in whom they provide these incentives for enrollment; the school-age child or the caregivers. These results suggest that the education subsidy provided by the

Table 3.3: FFE Impacts on Enrollment, Treatment Group DID, 2005-2007

	(1) Net Enrollment 6-13	(2) Gross Enrollment 6-13	(3) Net Enrollment 6-9
SFP*R2	-.045	-.041	-.025
	(.041)	(.033)	(.058)
THR*R2	-.022	-.023	.007
	(.038)	(.031)	(.060)
R2	.079**	.070**	.078*
	(.035)	(.029)	(.047)
SFP	.060	.056*	.067
	(.037)	(.029)	(.051)
THR	.055	.050	.054
	(.039)	(.032)	(.058)
Age	.033***	.018***	.101***
	(.003)	(.002)	(.011)
Female	-.017	-.015	-.008
	(.015)	(.012)	(.018)
Pader	.030*	.025**	.045*
	(.015)	(.012)	(.026)
Constant	.489***	.651***	-.033
	(.056)	(.045)	(.115)
No. of Observations	3134	4018	1609
R^2	.07	.061	.103
p-value SFP=THR	0.347	0.375	0.525

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. R2 is a dummy variable indicating the observation is from the resurvey.

Table 3.4: FFE Impacts on Enrollment, DID with Child Fixed Effects

	(1) Net Enrollment 6-13	(2) Gross Enrollment 6-13	(3) Net Enrollment 6-9
SFP*R2	-.031	-.039	-.050
	(.041)	(.034)	(.071)
THR*R2	-.015	-.028	-.039
	(.040)	(.034)	(.073)
R2	.129***	.110***	.256***
	(.035)	(.030)	(.059)
Constant	.812***	.854***	.685***
	(.009)	(.007)	(.017)
No. of Observations	3717	4768	1902
R^2	.077	.055	.182
p-value SFP=THR	0.583	0.633	0.857

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. R2 is a dummy variable indicating the observation is from the resurvey.

Table 3.5: FFE Impacts on Enrollment, SD R1 Enrollment Zero

	(1) Enrollment All	(2) Enrollment 6-13	(3) Enrollment 6-9
SFP	.035	.089**	.094**
	(.039)	(.035)	(.040)
THR	.060	.059	.054
	(.044)	(.060)	(.058)
Age	.038***	-.021	.021
	(.007)	(.023)	(.023)
Female	-.044*	-.093**	-.071*
	(.025)	(.036)	(.038)
Pader	.040	.063	.051
	(.031)	(.039)	(.042)
Constant	.478***	1.012***	.686***
	(.076)	(.189)	(.209)
No. of Observations	762	183	156
R^2	.063	.054	.043
p-value SFP=THR	0.464	0.593	0.474

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%.

FFE programs were not large enough to change average enrollment rates of school age children, who were already enrolled at fairly high rates as a result of the UPE policy. However, focusing on children who had not enrolled in school but who should have already been enrolled at baseline shows that the SFP program may have played a significant role in bringing these children into school. Given the estimated impact of the in-school meals program was not significantly different than the THR program for this measure, we cannot conclude whether providing incentives for enrollment directly to the child, by providing meals at school, was an important factor contributing to this result.

3.5.2 Attendance

The survey data allow us to construct several measures of primary school attendance on which to examine the impacts of the FFE programs. Unannounced attendance visits were conducted at four intervals during the first year of the program and self-reported attendance data was collected in the household survey during the baseline and resurvey for all children enrolled in primary school. The attendance variable from the unannounced visits is defined as 1 if the child attended school that day and 0 if the child did not attend school, regardless of whether the child was enrolled. These data were collected in both the morning and in the afternoon for all children age 6-17 at baseline who could be identified. Children in grades 1 and 2 in Uganda do not attend school in the afternoon, so they are not included in the afternoon attendance visits. Not all of the schools were visited during each unannounced attendance data collection round, so some but not all, children have multiple observations in these data.

Attendance may vary systematically through the school year due to periodic demand for work on farms, for example, so we control for the month of the attendance visit in all attendance estimates based on the unannounced attendance data. From the self-reported attendance data in the two rounds of the household survey, we measure attendance as the number of days a child attended school in the last 7 days in proportion to the number of

days the school was open (usually 5). We believe the attendance measures based on the unannounced attendance visits provide the strongest measure of primary school attendance. Respondents to the household survey may have been inclined to overstate their child's attendance if they believed the data may then be reported to school officials. As a result, self-reported attendance rates were much higher than attendance rates observed in unannounced attendance visits.

In the second household survey round, average self-reported attendance over the past week was 95.3 percent, while average morning attendance was only 74.2 percent during the unannounced attendance visits. As noted in table 3.1, there was significant sampling error in the baseline self-reported attendance rates from the household survey between the SFP and control groups. Given the maximum attendance possible is 100 percent and the high baseline self-reported means, there is little room for improvements in attendance rates, especially in the SFP group.

Table 3.6 presents results of the impact of the FFE programs on attendance taken in the morning during unannounced attendance visits. We find positive and statistically significant impacts of both the SFP and THR programs on the morning attendance of older children, aged 10-17, ranging from 8-12 percent. In table 3.7 we divide the sample by gender and report results for girls in columns (1)-(5) and for boys in columns (6)-(10). We find that the in-school meals program had a positive impact on the morning attendance of girls of all ages and that the THR program had a significant positive impact on the attendance of boys aged 10-17. Again, for both girls and boys, the impacts of the two programs are not significantly different from one another except for the impact on boys aged 10-17, where the THR program performs significantly better than the SFP program.

Tables 3.8 and 3.9 present the same results as tables 3.6 and 3.7 but for afternoon attendance. Similarly to the morning attendance results, we find positive impacts of access to in-school meals on all age groups in table 3.8 and positive impacts of access to take-home rations on 6-9 year olds and 10-17 olds, but not 10-13 olds. When the sample is separated by gender in table 3.9, we find positive impacts of both programs on girls aged 6-9 and

Table 3.6: Impact of FFE on Morning School Attendance

	(1)	(2)	(3)	(4)	(5)
	6-13	6-17	6-9	10-13	10-17
SFP	.072	.085*	.090	.058	.084*
	(.047)	(.050)	(.056)	(.047)	(.051)
THR	.063	.091*	.055	.075	.118**
	(.047)	(.051)	(.058)	(.050)	(.056)
Age	.015***	-.0002	.025	.031**	-.014**
	(.004)	(.003)	(.016)	(.014)	(.007)
Female	-.039**	-.040**	-.016	-.060***	-.059***
	(.017)	(.016)	(.025)	(.022)	(.019)
Pader	.163***	.159***	.193***	.131***	.134***
	(.041)	(.041)	(.054)	(.037)	(.039)
May	-.163***	-.116***	-.124*	-.201***	-.107**
	(.043)	(.039)	(.067)	(.053)	(.054)
June	-.120**	-.123**	-.208***	-.050	-.074
	(.060)	(.054)	(.067)	(.062)	(.052)
July	-.166**	-.173*	-.294***	-.051	-.094
	(.083)	(.089)	(.113)	(.055)	(.069)
November	-.083	-.078	-.184***	.0002	-.015
	(.059)	(.052)	(.067)	(.056)	(.044)
December	.051	.073	-.073	.171**	.182***
	(.072)	(.070)	(.086)	(.069)	(.068)
Constant	.601***	.716***	.591***	.373**	.854***
	(.067)	(.053)	(.164)	(.168)	(.087)
No. of Observations	2266	2782	1177	1089	1605
R^2	.052	.044	.057	.061	.051
p-value SFP=THR	0.818	0.885	0.537	0.661	0.366

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. May through December are dummy variables for the month of the unannounced attendance visit. The omitted month is April.

Table 3.7: Impact of FFE on Morning School Attendance by Gender

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
			Female					Male		
	6-13	6-17	6-9	10-13	10-17	6-13	6-17	6-9	10-13	10-17
SFP	.111**	.108*	.115*	.131**	.114**	.038	.067	.067	.019	.068
	(.053)	(.055)	(.066)	(.062)	(.057)	(.047)	(.051)	(.052)	(.052)	(.057)
THR	.070	.080	.061	.096	.102	.064	.105*	.045	.085	.145**
	(.054)	(.054)	(.077)	(.062)	(.062)	(.049)	(.056)	(.063)	(.052)	(.059)
Age	.017**	.002	.041*	.067***	-.003	.014***	-.002	.008	.003	-.023***
	(.007)	(.005)	(.025)	(.022)	(.010)	(.005)	(.004)	(.016)	(.012)	(.008)
Pader	.176***	.179***	.187***	.161***	.175***	.154***	.143***	.201***	.110**	.102**
	(.043)	(.043)	(.063)	(.039)	(.038)	(.045)	(.045)	(.055)	(.048)	(.048)
May	-.215***	-.134***	-.125	-.302***	-.130*	-.101	-.094	-.120	-.105	-.087
	(.060)	(.052)	(.117)	(.100)	(.078)	(.064)	(.057)	(.081)	(.086)	(.077)
June	-.092	-.096	-.154*	-.051	-.068	-.145**	-.147**	-.266***	-.055	-.085
	(.076)	(.066)	(.083)	(.082)	(.060)	(.060)	(.065)	(.083)	(.069)	(.081)
July	-.180*	-.220*	-.300**	-.076	-.177	-.162*	-.141	-.304**	-.040	-.037
	(.098)	(.124)	(.133)	(.065)	(.109)	(.095)	(.089)	(.125)	(.077)	(.082)
November	-.034	-.032	-.135*	.055	.034	-.131**	-.120*	-.235***	-.056	-.059
	(.067)	(.058)	(.070)	(.066)	(.050)	(.066)	(.065)	(.081)	(.070)	(.073)
December	.148*	.156*	.046	.248***	.253***	-.052	-.007	-.235**	.115	.138
	(.082)	(.081)	(.095)	(.086)	(.082)	(.074)	(.075)	(.093)	(.082)	(.089)
Constant	.489***	.613***	.397**	-.176	.605***	.664***	.771***	.777***	.745***	1.003***
	(.094)	(.069)	(.198)	(.254)	(.118)	(.068)	(.055)	(.156)	(.154)	(.101)
No. of Observations	1108	1316	603	505	713	1158	1466	574	584	892
R^2	.068	.06	.067	.115	.07	.041	.035	.054	.033	.049
p-value SFP=THR	0.322	0.492	0.471	0.289	0.766	0.595	0.391	0.709	0.181	0.080*

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. May through December are dummy variables for the month of the unannounced attendance visit. The omitted month is April.

Table 3.8: Impact of FFE on Afternoon School Attendance

	(1)	(2)	(3)	(4)	(5)
	6-13	6-17	6-9	10-13	10-17
SFP	.122**	.146***	.252***	.064*	.114***
	(.050)	(.048)	(.076)	(.037)	(.040)
THR	.093*	.141***	.205**	.051	.120***
	(.049)	(.049)	(.084)	(.045)	(.043)
Age	.035***	.008	.067**	.025	-.014**
	(.008)	(.005)	(.028)	(.017)	(.007)
Female	.006	-.010	.0009	.015	-.011
	(.024)	(.020)	(.043)	(.031)	(.026)
Pader	.089**	.086**	.158**	.057	.059*
	(.042)	(.040)	(.076)	(.035)	(.032)
May	-.210**	-.136	-.185	-.240***	-.160**
	(.095)	(.089)	(.135)	(.072)	(.068)
June	-.018	-.042	-.008	-.034	-.067
	(.095)	(.088)	(.144)	(.073)	(.063)
July	-.030	-.019	.008	-.065	-.043
	(.101)	(.098)	(.189)	(.075)	(.072)
November	-.002	-.006	-.011	-.019	-.018
	(.096)	(.088)	(.149)	(.064)	(.058)
December	.155	.189*	.363**	.047	.142*
	(.112)	(.105)	(.173)	(.076)	(.075)
Constant	.200	.453***	-.170	.391*	.791***
	(.138)	(.103)	(.301)	(.204)	(.089)
No. of Observations	1359	1855	424	935	1431
R^2	.049	.03	.096	.021	.026
p-value SFP=THR	0.493	0.886	0.509	0.755	0.835

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. May through December are dummy variables for the month of the unannounced attendance visit. The omitted month is April.

positive impacts of the THR program on 10-17 year old boys. It is important to note that the 6-9 year old girls with afternoon attendance information are in grades 3 and above.

These results show considerable impacts of the SFP and THR programs on school attendance. Based on the results from unannounced attendance data, we find significant positive impacts of both in-school meals and take-home rations on morning and afternoon attendance. For most age group and gender categories, we cannot reject the equality of impacts of both programs. This suggests one of the following three possibilities, or a combination of the

Table 3.9: Impact of FFE on Afternoon School Attendance by Gender

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
			Female					Male		
	6-13	6-17	6-9	10-13	10-17	6-13	6-17	6-9	10-13	10-17
SFP	.179**	.180**	.354***	.062	.098	.082	.124***	.113	.076	.126***
	(.076)	(.074)	(.094)	(.071)	(.069)	(.050)	(.039)	(.081)	(.050)	(.035)
THR	.097	.132*	.242**	-.002	.057	.096**	.149***	.135	.107*	.164***
	(.080)	(.077)	(.104)	(.078)	(.074)	(.048)	(.044)	(.098)	(.055)	(.045)
Age	.043***	.009	.069**	.044	-.019*	.027***	.006	.072*	.008	-.012
	(.010)	(.007)	(.030)	(.028)	(.011)	(.008)	(.007)	(.040)	(.014)	(.009)
Pader	.129***	.137***	.180**	.094**	.113***	.062	.050	.134	.025	.021
	(.048)	(.052)	(.090)	(.042)	(.042)	(.046)	(.039)	(.082)	(.044)	(.036)
May	-.354***	-.219*	-.285**	-.384***	-.227**	-.037	-.039	-.044	-.097	-.097
	(.134)	(.123)	(.143)	(.124)	(.113)	(.097)	(.092)	(.137)	(.085)	(.081)
June	-.048	-.069	-.186	.001	-.046	.006	-.022	.178	-.078	-.095
	(.120)	(.100)	(.148)	(.102)	(.078)	(.095)	(.106)	(.154)	(.082)	(.100)
July	.002	-.026	.011	-.008	-.048	-.057	-.013	.043	-.133	-.054
	(.110)	(.123)	(.233)	(.083)	(.109)	(.118)	(.114)	(.178)	(.113)	(.107)
November	.018	.007	-.080	.032	.018	-.022	-.018	.050	-.081	-.060
	(.106)	(.094)	(.150)	(.083)	(.073)	(.110)	(.111)	(.168)	(.091)	(.099)
December	.181	.226*	.275	.043	.194*	.141	.165	.507***	.038	.106
	(.136)	(.127)	(.175)	(.118)	(.113)	(.118)	(.118)	(.192)	(.099)	(.106)
Constant	.079	.393***	-.177	.158	.825***	.320**	.497***	-.180	.622***	.797***
	(.165)	(.123)	(.308)	(.359)	(.157)	(.144)	(.117)	(.392)	(.175)	(.119)
No. of Observations	619	821	207	412	614	740	1034	217	523	817
R^2	.099	.057	.157	.065	.045	.025	.018	.076	.011	.025
p-value SFP=THR	0.069*	0.328	0.194	0.132	0.312	0.769	0.543	0.805	0.539	0.348

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. May through December are dummy variables for the month of the unannounced attendance visit. The omitted month is April.

three. Either the flypaper effect of both programs is similar, or to whom the incentive is directly given, either the child or the caregiver, does not play a significant role, or the timing of meals is not the major contributor to the impacts of access to the programs on attendance.

The results on self-reported attendance are not as encouraging, though we believe these estimates are affected by sampling error, recall bias, and possibly anticipation effects. Estimates reported in table 3.10 indicate that in-school meals lead to a weakly significant reduction in the number of reported days a child attended school in the previous week from 2005 to 2007. This negative effect of the SFP program is found on average for children aged 6-13 and 6-17. The results show no impact of the THR program on any measures of self-reported attendance. We believe the large and significant difference in baseline self-reported attendance between the SFP and control groups is responsible for these negative results. Although difference-in-differences estimates account for baseline differences in outcomes, the fact that the attendance measure is bounded at 100 percent may account for the significant negative impacts of the SFP program we have found.

3.5.3 Age at Entry to Primary School

The FFE programs have the potential to reduce age at entry to primary school but, in the short-run, may attract older children to school who, without the program, would not have entered primary school at all. Therefore, the impact of the programs after two years is ambiguous. In Uganda, the recommended age for beginning primary school is six years old but the average age at entry in our sample in the baseline is over seven years old. There are no significant differences in the age at entry across treatment groups in the baseline as reported in Table 3.1. Column (1) of table 3.11 reports difference-in-difference impacts for the mean age at entry by treatment group. There is no statistically significant impact of either FFE program on age at entry. Next, we focus solely on those children who began primary school after the baseline survey. In column (2), we present single difference estimates of children who were not yet enrolled in primary school in the

Table 3.10: Impacts on Self-Reported Attendance, DID with Child Fixed Effects

	(1)	(2)	(3)	(4)	(5)
	6-13	6-17	6-9	10-13	10-17
SFP*R2	-.060*	-.053*	-.069	-.032	-.033
	(.031)	(.032)	(.042)	(.038)	(.034)
THR*R2	-.022	-.017	-.045	.013	.005
	(.042)	(.040)	(.058)	(.051)	(.038)
R2	.080***	.072**	.096***	.055	.053*
	(.029)	(.030)	(.037)	(.035)	(.031)
Constant	.911***	.909***	.904***	.915***	.911***
	(.009)	(.008)	(.013)	(.010)	(.008)
No. of Observations	3122	3888	1488	1634	2400
R^2	.039	.032	.035	.039	.027
p-value SFP=THR	0.251	0.211	0.629	0.255	0.164

Notes: Standard errors are in parentheses and are clustered at the camp level.
* significant at 10%, ** significant at 5%, *** significant at 1%.
R2 is a dummy variable indicating the observation is from the resurvey.

Table 3.11: Age at Entry to Primary School

	(1)	(2)
	DID	SD
	6-13	6-13
SFP*R2	-.045	
	(.129)	
THR*R2	-.007	
	(.101)	
SFP	-.052	-.150*
	(.139)	(.090)
THR	-.128	-.204**
	(.137)	(.097)
R2	-.231***	
	(.077)	
Female	.062	.108
	(.046)	(.096)
Pader	-.061	-.336***
	(.067)	(.085)
Constant	7.128***	6.907***
	(.118)	(.084)
No. of Observations	2733	622
R^2	.012	.03
p-value SFP=THR	0.761	0.610

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. R2 is a dummy variable indicating the observation is from the resurvey.

baseline. We find a significant impact of both programs on age at entry to primary school, reducing the age of entry by about two standard deviations.

3.5.4 Grade Repetition

Grade repetition is quite common in the sample, with 44 percent of children enrolled in primary school at baseline having repeated at least one class. FFE programs should reduce grade repetition if they improve learning. Results regarding learning are presented in chapter 4. There are no differences in the number of classes repeated in the baseline across treatment groups as reported in table 3.1. Results are reported in Table 3.12. Column (1) reports treatment group difference-in-difference estimates, and columns (2) and (3)

Table 3.12: Impact of FFE on Grade Repetition

	(1)	(2)	(3)	(4)	(5)	(6)
		DID		Child Fixed Effects		
	All	Girls	Boys	All	Girls	Boys
	6-13	6-13	6-13	6-13	6-13	6-13
SFP*R2	-.115	-.020	-.212**	-.151**	-.080	-.213**
	(.077)	(.081)	(.103)	(.072)	(.109)	(.094)
THR*R2	-.099	-.081	-.119	-.108	-.134	-.094
	(.079)	(.093)	(.100)	(.081)	(.104)	(.117)
R2	.047	.014	.084	.200***	.188**	.213***
	(.058)	(.057)	(.077)	(.063)	(.091)	(.052)
SFP	.045	-.027	.118			
	(.065)	(.073)	(.091)			
THR	.112*	.072	.156*			
	(.064)	(.079)	(.091)			
Female	.026					
	(.026)					
Age	.094***	.089***	.099***			
	(.006)	(.008)	(.009)			
Pader	.008	-.012	.027			
	(.027)	(.038)	(.037)			
Constant	-.469***	-.349***	-.570***	.413***	.414***	.412***
	(.061)	(.089)	(.095)	(.018)	(.025)	(.031)
No. of Observations	2691	1341	1350	3196	1607	1589
R^2	.086	.077	.096	.015	.016	.018
p-value SFP=THR	0.828	0.525	0.327	0.490	0.500	0.368

Notes: Standard errors are in parentheses and are clustered at the camp level.
* significant at 10%, ** significant at 5%, *** significant at 1%.
R2 is a dummy variable indicating the observation is from the resurvey.

present these estimates by gender. The results show that the in-school meals program lead to a significant decrease in the number of classes repeated for boys. Columns (4)-(6) presents child fixed effects for all children, and again by gender. The results are consistent with the treatment group difference-in-difference estimates. However, there is no significant difference in the impacts of the two treatments.

3.5.5 Progression to Secondary School

Conceptually, The FFE programs' impacts on progression to secondary school are ambiguous. The programs may have enticed pupils to remain in primary school instead of continuing to secondary school in order to continue

to receive the transfers. Alternatively, the programs may have improved learning and progression within primary school and, therefore, increased progression to secondary school. Both of these possibilities are examined below.

We investigate the impact of the FFE programs on progression to secondary as well as on an alternative measure, remaining in primary school. The latter measure considers whether children in the late grades at the start of the FFE programs remained in primary school longer in order to continue to receive the interventions. The sample of interest is pupils in grades 6 and 7 during the baseline survey. Those in grade 7 were expected to complete primary school shortly after the survey and before the introduction of the interventions. Those in grade 6 would receive an intervention or be assigned to the control group the following year. If they did not repeat the class, they would have been expected to complete primary school and begin secondary school prior to the resurvey. These two samples allow us to study the impact of the interventions on the progression to secondary school and on the completion of primary school.

Many of the pupils in grades 6 and 7 in the 2005 baseline survey repeated a grade and had not progressed to secondary by 2007. Of the grade 6 pupils in the baseline who had not progressed to secondary school by the time of the resurvey, 19 percent remained in grade 6, 37 percent were attending grade 7, and 33 percent were no longer attending school. Seventy percent of pupils who did not progress to secondary school were in grade 6 at the baseline, while the remaining 30 percent had been in grade 7.

Results are reported in table 3.13. Results on progression to secondary school are presented in column (1). As expected the coefficients on the interventions interacted with grade 7 are insignificant because these individuals were effectively untreated when they completed primary school at the end of 2005. In addition, we find no impact of the programs on pupils in grade 6 in the baseline. Therefore, we investigate whether in fact the programs are resulting in individuals remaining in primary school. These results are presented in column (2). We find an increase in the probability of remaining in primary school with the introduction of in-school meals, though the ef-

Table 3.13: FFE Impacts on Progression to Secondary School

	(1)	(2)
	Progression to Secondary	Remaining in Primary
P6*SFP	-.010	.178**
	(.081)	(.083)
P6*THR	.019	.040
	(.081)	(.094)
P7*SFP	.080	.017
	(.146)	(.133)
P7*THR	.063	-.128
	(.144)	(.149)
P6	-.222*	.140
	(.119)	(.151)
Age	-.002	-.015
	(.007)	(.011)
Female	-.070	-.036
	(.051)	(.070)
Pader	.125**	-.073
	(.051)	(.061)
Constant	.337*	.619**
	(.193)	(.257)
No. of Observations	214	214
R^2	.137	.108
p-value SFP=THR	0.613	0.096*

Notes: Standard errors are in parentheses and are clustered at the camp level.
* significant at 10%, ** significant at 5%, *** significant at 1%.

fect is weakly significant. This suggests the possibility that in-school meals may have the unintended effect of increasing the completion time of primary school, at least in the short term. If this effect is at work, it could be removed by offering a similar in-school meals program in secondary schools.

3.6 Conclusion

FFE programs are generally acknowledged to increase primary school participation. However, the size of these effects varies by context and the number of rigorous evaluations of this topic is relatively few. This chapter presents new evidence on the impact of two different methods of food for education delivery on school participation in Northern Uganda using a

prospective, randomized controlled evaluation design. Moreover, this study compares the impacts of the World Food Programme's in-school meals program with an experimental take-home rations program conditional on school attendance. Differences between these two modalities in the timing of meals and in the control over the food could lead to differences in impacts.

The results show positive impacts of the in-school meals program on primary school enrollment when we restrict the analysis to children who were not enrolled before the introduction of the FFE programs. Though only the impact of the SFP program is statistically significant, we do not find significant differences between the impacts of the two programs. Moreover, based on the results from unannounced attendance data, we find significant positive impacts of both in-school meals and take-home rations on morning and afternoon attendance. The results also show a weakly significant impact of both FFE programs on age at entry. Furthermore, we find a reduction in grade repetition from the SFP program for boys, but the SFP impact is not statistically different from the THR program. Finally, we find no impact of either program on progression to secondary school. However, children in grades 6 in school feeding program schools in 2005 were significantly more likely to remain in primary school as of 2007. This suggests that school meals may have the unintended effect of increasing the time taken to complete primary school.

These results lend considerable support to the potential for FFE programs to achieve their primary goal of increasing school participation. In general, both the SFP and THR program performed similarly well. These results suggest that food for education programs remain an effective strategy for attracting children to school.

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Chapter 4

School Feeding Programs, Cognitive Development, and Learning in Northern Uganda[1]

4.1 Introduction

The recent adoption of Universal Primary Education initiatives in many developing countries has increased attention on complementary social programs that can expand the gains in primary school enrollment from UPE by improving attendance and school performance as well. School feeding programs are among the most common social programs aimed at school-aged children[2] and can be effective at increasing attendance (chapter 3 of this dissertation, Kazianga et al. (2008)). In addition, if the programs provide nutritious food in sufficient quantity in areas with moderate to severe malnutrition rates, they may plausibly contribute to cognitive development and learning, the ultimate goals of expanding access to education. This combination of drawing children to school and improving the nutritional quality of their diets while they learn is the unique attraction of school feeding programs. As a form of education-related social protection, school feeding

[1] A version of this chapter will be submitted for publication. Adelman, S., Alderman, H. Gilligan, D.O., and Lehrer, K. School Feeding Programs, Cognitive Development, and Learning in Northern Uganda.

[2] The World Food Programme reached 21.7 million children with school feeding transfers in 2005 (WFP (2006a)) and many governments operate publicly funded programs. Brazil's national school feeding program covers 36 million children age 0-14 (WFP (2006b)).

faces competition from popular alternatives such as conditional cash transfer (CCT) programs. However, the debate about which type of program is most cost-effective is hampered by a lack of evidence on the impact of school feeding programs on cognitive development and learning[3].

Most research that addresses the potential effects of school feeding programs on cognitive development in developing countries is based on controlled feeding trials conducted in schools. These studies show that the provision of food leads to limited improvements in cognitive function that depend on the nutrient quality of the food, the nutritional status of the children, and the measure of cognitive ability (Whaley et al. (2003), van Stuijvenberg et al. (1999), and Simeon and Grantham-McGregor (1989))[4]. In the only study in addition to our own that measures the impact of school feeding programs on cognitive development, Kazianga et al. (2008) find no impact of school feeding transfers on two measures of cognitive development in Burkina Faso. Regarding learning achievement, Ahmed (2004) provides non-experimental evidence that on-site school meals improve scores on arithmetic tests for fifth graders. Ahmed and del Ninno (2002) find that a program providing take-home food rations conditional on school attendance in Bangladesh was associated with a significant reduction in mean achievement test scores for fourth-grade students in program schools, probably due to the entry of poorer performing students into those schools. Tan et al. (1999) provide experimental evidence that first-grade students in the Philippines increased their English test scores after starting a school feeding program. Kazianga et al. (2008) find impacts of school feeding on the time it took girls' to answer simple arithmetic questions, but not on the number of correct answers for either girls or boys.

[3]Despite the relative youth of CCT programs, more is known about their impact on cognitive development (Fernald et al. (2008), Paxson and Schady (2007), Paxson and Schady (2008), Macours et al. (2008)) and learning (Filmer and Schady (2009), Ponce and Bedi (2008), Behrman et al. (2005), Behrman et al. (2000)) because CCTs became popular during, and partly because of, the emergence of evaluations as an identification strategy in economics. See The World Bank (2009) for a review.

[4]In a survey of experiments conducted in the United States during the early 1980s, Pollitt (1995) concludes that children who ate breakfast performed better on problem solving and arithmetic tests.

These studies have several limitations regarding the strength of the evidence on the impact of school feeding programs on cognitive development and learning. First, the feeding trials suggest that the nutrition provided in school meals may directly improve cognitive development, but it is not clear whether these results would be obtained in a less controlled setting. With the exception of Kazianga et al. (2008), the evidence of impacts of school feeding on test scores, while suggestive, may suffer from selection effects, as was the case in the Bangladesh study, or from small samples, as was the case in the Philippines study.

In addition, these studies do not shed light on the pathways through which school feeding improves learning and cognitive functioning. If school feeding programs induce better school attendance, improvements in cognitive development and test scores may be due to more time spent learning. On the other hand, improving nutrient status or reducing short term hunger could improve children's cognitive abilities and their capacity to learn. The ambiguity regarding the relative contribution of attendance and nutrition to cognitive development and learning raises important questions about the design of school feeding programs. For example, does the timing of meals matter to the learning effects of these programs? Furthermore, how would the learning and cognitive impacts differ if the food was provided at home rather than at school[5]?

This study overcomes the limitations of the previous literature regarding impact measurement and impact pathways. We take advantage of a school feeding experiment conducted in Northern Uganda to provide rare causal evidence of the impact of school feeding programs on cognitive development and learning achievement. In addition, we exploit differences in program design to examine the relative contribution of school attendance and nutrition to the cognitive and learning outcomes. In collaboration with the World Food Programme, we conducted a prospective randomized controlled field experiment in which communities were randomly assigned into an on-site school feeding program (SFP), a take-home ration program (THR) condi-

[5]The study by Kazianga et al. (2008) does address differences in impacts between on-site school meals and take-home rations.

tional on school attendance, or a control group. Children in SFP schools received a mid-morning snack and lunch on each day they attended school. These meals were substantial and nutritious; they provided more than 1,000 kcals of energy and met 99 percent of daily iron requirements and more than two-thirds of other micronutrient requirements. Households with children enrolled in THR schools received a monthly food ration for each child that attended school at least 85 percent of school days in the previous month. In order to equalize the endowment effects of the programs, rations under both modalities were designed so that children attending school every day would receive the same quantity and composition of food transfer from either program. Household and school surveys were conducted in 2005 prior to program implementation and again in 2007, after the programs had been in place for 18 months. The data collected included detailed information on child, household, and school characteristics. Child nutritional status was measured by anthropometry (height and weight) and anemia prevalence. School participation was measured through unannounced attendance visits in order to avoid the bias in attendance measures based on respondents' own accounts or school records. Learning performance was measured in each round through achievement test scores and three measures of cognitive development were assessed for every school-aged child in 2007.

This randomized experiment was conducted in two districts in Northern Uganda during a period of conflict and insecurity. In 2005, during the baseline data collection, the rural population of these districts was displaced from their homes into Internally Displaced People's Camps. We argue that this is a very relevant setting in which to analyze the impacts of food for education programs. In 2004, 50 percent of all World Food Programme school feeding beneficiaries were part of an emergency response (World Food Programme (2007))[6]. The World Food Programme also notes that "[t]he scant documentation and limited existing body of knowledge about school feeding projects in emergency contexts does not indeed correspond to the significant

[6]WFP defines emergency contexts to be "natural, man-made, slow or sudden onset, and with different population groups; refugees, Internally Displaced Persons (IDPs), host communities." (World Food Programme (2007), p.2).

number of SF projects carried out in WFP Emergency or Protracted Relief and Recovery Operations" (World Food Programme (2007), p.4).

We find significant positive impacts of both programs on three measures of cognitive development, primarily for girls. We also find a positive impact of the THR program on Primary Leaving Exam results. However, we generally find no impact of access to either program on literacy and numeracy test scores.

The results of our analysis make several contributions to the literature. First, ours is one of only two studies with rigorous field-based evidence of the impact of school feeding programs on cognitive development. We also contribute consistent experimental evidence of the impacts of SFP and THR transfers on learning achievement from more than one outcome measure. We measure learning from arithmetic and literacy achievement tests conducted for this study as well as from the Ugandan national primary school leaving exam.

Furthermore, we show that there is heterogeneity in the gender and age distribution of program impacts on school attendance and anemia status. We compare these results to the incidence of impacts on cognitive and achievement test scores across age-gender cohorts to examine the relative contributions of the attendance and nutrition effects of the programs to improvements in cognitive development and learning. The variation in access to the nutrition and schooling benefits of the programs is not exogenous. However, we argue that differences across age-gender cohorts in the opportunity costs of schooling and in the ability to respond to nutrition exist. Moreover, they provide an external source of variability in the opportunity cost and benefits of the programs. As a result, comparing the patterns of impacts of the programs on attendance and nutrition across age-gender cohorts to the pattern of effects on cognitive and learning outcomes suggests possible mechanisms for the observed effects. Although these relationships are not causal, they provide plausible estimates of the relative contributions of increased attendance and improved nutrition to the cognitive and learning impacts.

Moreover, by comparing differences in outcomes across SFP and THR

modalities, we present evidence of the relative importance of the timing of meals during the day on school performance and provide indirect evidence of the relative size of the 'intrahousehold flypaper effect' between the two modalities (Jacoby (2002)[7]). Children in SFP schools had greater access to the food transfers during the school day than those in THR schools whose households faced the additional cost of preparing food at home for the child to carry to school or to eat at home during the school lunch break. This suggests that the SFP transfers should have larger impacts on school performance than those from the THR program if the reduction in short-term hunger obtained by providing meals during the school day improves learning through increased concentration and learning efficiency[8]. Moreover, because take-home rations are more easily redistributed to other household members than rations received at school, which can only be indirectly diverted by withholding food at other meals, flypaper effects should be at least as large for SFP beneficiaries as for THR beneficiaries. As a result, SFP effects on test scores and cognitive development will be larger if THR has weak flypaper effects. If the effects of the two programs are comparable, then either the share of the transfer reaching children in the THR and SFP programs is similar or the nutrition effects are not important determinants of these cognitive and learning outcomes.

Finally, the comparison between SFP and THR programs also provides lessons for the design of school feeding interventions. In large schools, such as those in the Northern Uganda sample, school feeding programs can be disruptive and may reduce time available for instruction. As a result of the cost savings from not operating school kitchens, take-home rations programs can be cheaper for schools to implement. Our results concerning the relative impact of SFP and THR transfers suggest that THR programs may be more cost-effective, at least for the cognitive and learning outcomes considered

[7] The size of the intrahousehold flypaper effect is the share of the food transfer that 'sticks' to the targeted child rather than being redistributed to other household members.

[8] An important caveat is that this statement assumes that the attendance impacts of both programs are the same. In addition, there is the possibility that in-school meals may lead to a disruption in learning time induced by the need to cook, serve, and eat meals twice a day in the in-school meals schools.

here.

The remainder of this chapter is organized as follows. Section 4.2 explores the alternative mechanisms through which food for education programs affect cognition and learning. Section 4.3 provides an overview of the study design, the FFE programs, and the data. The results are presented in section 4.4 and section 4.5 discusses the contribution of attendance and nutrition to the changes in cognition and learning. Section 4.6 concludes.

4.2 The Conceptual Framework

Food for education programs lead to greater investment in education primarily by subsidizing schooling costs. Moreover, the food provided in the program can help a child learn more effectively, thereby increasing the long-run returns to education. Adelman et al. (2008) describe the mechanisms by which SFP and THR programs impact various schooling outcomes, including learning achievement and cognitive development, which is summarized below. This section begins with a detailed discussion of the theoretical impacts of in-school meals and concludes with a comparison of these effects with a take-home rations program.

The effect of in-school meals on learning achievement works through two mechanisms: attendance and nutrition. SFP subsidizes the cost of school participation; increasing enrollment and attendance rates. The conditionality of in-school meals, i.e., children receive the meal only on days when they attend, may increase participation in addition to the pure income effect of the program. Given the opportunity cost of a child attending school can vary across school days, according to seasonal demand for agricultural labour for example, the effectiveness of in-school meals at changing school attendance rates depends on the value of the meal relative to the difference between the cost and expected benefit of school attendance on a particular day. Furthermore, if households are credit constrained, it is possible that some households will reduce their food expenditure as a result of the in-school meals program. This may increase the available resources for education or change a school-aged child's activities. The child may then spend

fewer hours working or performing household tasks, allowing them to attend school more often.

In addition to reducing the costs of school participation, SFP may also increase the benefits by reducing short-term hunger or improving children's nutritional status, thus further increasing participation. In-school meals can alleviate a child's short-term hunger during the school day, either by providing more nutrients to the child, by providing the child with a meal when they would not otherwise have had one, or by replacing a meal that would have been received after school with one during school hours. A child who is not hungry during school hours is able to concentrate better and learn more effectively (Grantham-McGregor et al. (1998)). Such a child may benefit more in terms of learning from a day of school than a hungry child. In turn, this may impact households' schooling choices. Additionally, the child may prefer to attend school when they are not hungry. Moreover, sustained nutrition improvements through school feeding can improve a child's physiological capacity for learning, which has a direct effect on the benefits of schooling and an indirect effect by increasing the child's desire to attend school.

Finally, in-school meals may increase participation by reducing morbidity. In many developing country settings, morbidity is a leading cause of missed school days. Improved nutrition, especially adequate intake of micronutrients, can strengthen the immune system and reduce the incidence and severity of infectious diseases among children (Scrimshaw and SanGiovanni (1997)). Therefore, if in-school meals improve children's nutritional status, they may reduce morbidity and decrease the number of school days missed due to illness, thus increasing attendance.

Increased school participation may improve learning achievement as pupils spend more time in school and learning. However, this mechanism is dependent on the level of school quality, including teacher/student ratios, the availability of schooling inputs, and teacher quality, which may be affected by the program as well. If school meals increase enrollment rates and attendance, as expected, classrooms may become over-crowded and teaching quality may decrease. Similarly, if school feeding represents a significant

burden on the teachers' time, learning time may be reduced. Thus, unless additional financial and human resources are available, school feeding programs have the potential to worsen school quality compared to the pre-school feeding period.

SFP has the potential to improve learning achievement directly through improvements in short-term and long-term nutrition. The short-term impact of providing children with a meal during the school day is hunger alleviation which can improve concentration and learning efficacy, thereby improving school performance. In the long run, improvements in nutrition resulting from SFP can improve cognitive functioning, affecting the ability to learn. The magnitude of this effect will vary depending on the initial nutritional status of the child.

Pollitt (1995) discusses two biological mechanisms through which breakfast can affect cognition. By extension, these same mechanisms are present in an in-school meal setting, be it breakfast, snack, or lunch. The first is the short-term metabolic and neurohormonal changes that are associated with the immediate supply of energy and nutrients to the brain. Brain function is sensitive to these changes. If an overnight fast is extended because a child does not eat breakfast, insulin and glucose levels gradually decline and result in a stress response that interferes with different aspects of cognitive function. If this occurs frequently, it is likely to have a cumulative effect. This is the second biological mechanism discussed by Pollitt, which pertains to the longer term impacts of the sustained contributions of breakfast to a person's health status, which in turn affects cognitive development. To the extent that the in-school meal is, at least in part, an addition to the child's usual nutritional intake, then this second mechanism should also be present with in-school meals. It should then improve the nutritional status of a child in the long run. In addition, when the school meal is nutrient fortified, it may prevent or reduce nutritional deficiencies that affect cognition, such as iron deficiency.

Many of the mechanisms through which in-school meals can affect learning achievement and cognition also exist for take-home rations, particularly for impacts that derive primarily from the income effects of the transfer.

However, differences in education impacts between the two modalities arise for three reasons. Firstly, differences in how households redistribute food among their members under the two modalities. Secondly, constraints on the timing of meals under take-home rations. Thirdly, differences in the type of food provided. To consider the first two effects, assume that both programs provide exactly the same quantity and composition of food to the household over the course of one month.

The first effect represents a dilution of food transfers to the targeted child. With take-home rations, the entire household is targeted by the food transfers, as opposed to just the school-going child. When the rations are received at home rather than at school, it easier for the household to re-distribute the food to other household members. The second effect arises because of differences in the likely timing of food consumption under the two modalities. In-school meals provide food to pupils during school hours, which can increase concentration and the ability to learn. These effects can only be replicated under a take-home rations program if children are able to carry a meal of equivalent quantity and quality with them to school or are able to consume a meal at home at the same time of day. The relative effectiveness of the two modalities depends on the optimal time of day to provide food to maximize the learning benefits. Also, it is harder to approximate the timing of in-school meals through take-home rations, particularly with 'wet' rations which must be consumed at the time they are prepared. If the school meal is provided at breakfast, the benefits of this meal are fairly easily replicated at home with breakfast before school under the take-home rations program, provided the child does not have to travel a great distance to school and so must eat breakfast at home under take-home rations well before they would receive the food at a school breakfast. If a school meal of wet rations is provided as a mid-morning snack or school lunch, achieving the same effects through take-home rations would require that the child go home for the meal, disrupting the school day. Alternatively, if the learning benefits of consuming breakfast outweigh those of lunch, and the school meal is sub-optimally timed for later in the day, the meal could be better targeted at breakfast through take-home rations.

The third effect arises if the composition of the take-home ration differs from that of the in-school meals. As mentioned in 3.2, in-school meals often include milk products or other nutrient-dense foods while take-home rations typically include cereals and oils, which may or may not be fortified. Differences in the quality of the food may lead to different impacts on educational performance. However, these differences arise from the application of take-home rations and in-school meals in practice, and do not derive directly from differences in the two methods of food delivery. As noted earlier, another important distinction is that households may redistribute food differently under both programs. Thus, even if the in-school meals and take-home rations programs are constructed to provide equivalent food transfers, children may in fact receive different amounts of food of differing quality depending on the delivery method of the FFE program.

4.3 The Study Design

The estimation technique used to identify the impacts of the in-school meals program and the take-home rations program on cognitive development and learning achievement is identical to the one used to identify the impacts of the programs on school participation. This identification strategy and econometric specification are described in section 3.3. Moreover, a description of the food for education experiment in Northern Uganda is provided in section 1.4 which includes a description of the two programs as well as their randomization.

4.4 Results

4.4.1 Cognitive Development

The investigation of the impacts of the SFP and THR programs focuses first on obtaining accurate estimates of the average impacts of each program on children age 6-13. For both cognitive development and learning achievement, we present estimated average impacts using specifications that take

the best advantage of the data. Results also include differences in impacts by age and gender.

Cognitive development tests were conducted on 1358 children age 6-13 during the second survey round in 2007. They are described in detail in section 1.5. Table 4.1 presents summary statistics of the test scores for each test by gender and by age group, 6-9 and 10-13. Scores on the Raven's Colored Progressive Matrices ranged from 0-28, out of a possible 36, with a mean score of 10.7. As expected, Raven's scores increased with age. The Raven's scores are substantially lower than documented for children in a Raven's validation study in the Nakuru Municipality of Western Kenya (Costenbader and Ngari (2001)). Among 6-10 year olds in the Kenya study, boys obtained an average Raven's score of 16.9, while girls obtained an average score of 15.0.

Scores on the Digit Span Forward test ranged from 0-14, out of a possible 16, with a mean score of 5.5. Respondents scored much lower on the Digit Span Backward test, where scores ranged from 0-9, out of a possible 16, with a mean score of 2.5. As with the Raven's test, children in the older age cohort scored significantly better on both Digit Span tests than the younger children.

Estimated impacts of the SFP and THR programs on cognitive development tests varied by test instrument. However, the results indicate that both programs had broad and significant impacts on children's ability to manipulate concepts, as shown in the Digit Span Backward test. Moreover, access to the THR program improved girls' scores on all three tests of cognitive development, though only weakly so for the Raven's test. However, in most instances, we are unable to identify differences between the impacts of access to the SFP and THR programs. Tables 4.2-4.4 present impact estimates for each cognitive development test for all children age 6-13, as well as by gender and age groups.

For the Raven's test, which measures reasoning and perception, access to in-school meals weakly improved scores for 6-9 year old girls while access to the take-home rations program increased scores for girls aged 6-13. There were no significant impacts on boys' Raven's scores, when compared to the

Table 4.1: Cognitive Development Test Scores, Summary Statistics, 2007

	Raven's Colored Progressive Matrices			Digit Span Forward			Digit Span Backward		
Age	6-13	6-9	10-13	6-13	6-9	10-13	6-13	6-9	10-13
Full Sample	10.718	9.026	12.460	5.471	4.920	6.039	2.506	1.489	3.553
	(4.973)	(4.685)	(4.6510)	(1.806)	(1.713)	(1.722)	(2.214)	(1.915)	(2.003)
No. of Observations	1358	689	669	1358	689	669	1358	689	669
Girls	10.440	9.113	11.863	5.526	5.139	5.942	2.435	1.567	3.368
	(4.769)	(4.605)	(4.531)	(1.752)	(1.674)	(1.741)	(2.184)	(1.941)	(2.043)
No. of Observations	682	353	329	682	353	329	682	353	329
Boys	10.999	8.935	13.038	5.416	4.690	6.132	2.577	1.408	3.732
	(5.159)	(4.774)	(4.699)	(1.858)	(1.726)	(1.701)	(2.243)	(1.887)	(1.950)
No. of Observations	676	336	340	676	336	340	676	336	340

control group. These results are reported in table 4.2.

Results for the Digit Span Forward test are reported in table 4.3. This test measures short-term memory. Access to the THR program improved Digit Span Forward test scores for all girls. However, boys aged 6-9 who had access to the THR program scored lower than boys aged 6-9 in the control group and this result is weakly significant.

The SFP and THR programs had much greater impact on the Digit Span Backward test, which measures both short-term memory and the ability to manipulate concepts. Results are reported in table 4.4. On this test, both access to the SFP and THR programs significantly improved test scores for 6-13 year olds on average and for girls in this age group. Boys aged 6-13 in the SFP program scored weakly higher than boys in the control group. Boys aged 6-13 in the THR program had significantly higher scores than boys in the control group.

Results on the cognitive development tests suggest broad impacts of both FFE programs on cognition. The Digit Span tests suggest that access to the FFE programs did not have a large impact on short term memory, but had extensive impacts on children's ability to manipulate concepts. This is important because this form of manipulation of concepts represents a higher order brain function than short-term memory, and it is one that may have payoffs in other areas of children's lives.

4.4.2 Learning Achievement

We first examine the impacts of access to both FFE programs on the the Primary Leaving Exam, written at the end of each school year by Ugandan pupils in grade 7. The test is described in section 1.5. To facilitate the interpretation of the results, we inverted the scales for the division and aggregate scores into increasing measures of test performance, so that an improvement in test scores would be positive. We estimate the impact of access to the SFP and THR programs on both the inverted division score and inverted aggregate score for children in the household survey who were enrolled in grades 6 and 7 in the baseline survey. From the school survey, we

Table 4.2: Raven Progressive Matrices

	6-13 All	6-9 All	10-13 All	6-13 Girls	6-9 Girls	10-13 Girls	6-13 Boys	6-9 Boys	10-13 Boys
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SFP	.104	.401	-.143	.770	1.121*	.514	-.408	-.227	-.581
	(.523)	(.469)	(.731)	(.650)	(.656)	(.794)	(.537)	(.636)	(.806)
THR	.746	.963**	.446	1.082*	1.046	1.071	.419	.905	-.092
	(.479)	(.488)	(.657)	(.615)	(.679)	(.699)	(.501)	(.679)	(.782)
Age	.968***	1.194***	.952***	.831***	1.426***	.805***	1.087***	.971***	1.115***
	(.060)	(.207)	(.186)	(.067)	(.262)	(.255)	(.088)	(.294)	(.298)
Pader	.861***	.404	1.368***	1.659***	1.122**	2.170***	.154	-.312	.657
	(.322)	(.367)	(.461)	(.450)	(.486)	(.561)	(.343)	(.485)	(.512)
Female	-.671**	-.004	-1.390***						
	(.274)	(.353)	(.327)						
Constant	1.233	-.717	1.666	1.065	-3.152	1.077	.771	1.609	.473
	(.770)	(1.641)	(2.351)	(.934)	(2.237)	(3.221)	(.966)	(2.325)	(3.519)
No. of Observations	1056	538	518	527	274	253	529	264	265
R^2	.189	.087	.089	.162	.129	.083	.224	.068	.075
p-value SFP=THR	0.0507*	0.2106	0.1545	0.5079	0.8895	0.2959	0.0254**	0.0515*	0.3441

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%.

Table 4.3: Digit Span Forward Test

	6-13 All	6-9 All	10-13 All	6-13 Girls	6-9 Girls	10-13 Girls	6-13 Boys	6-9 Boys	10-13 Boys
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SFP	.110	.173	.077	.249	.326	.203	-.019	-.021	-.044
	(.186)	(.215)	(.244)	(.237)	(.291)	(.344)	(.193)	(.251)	(.292)
THR	.262	.155	.368*	.495**	.668***	.277	.029	-.425*	.460
	(.170)	(.176)	(.217)	(.205)	(.240)	(.311)	(.203)	(.251)	(.330)
Age	.308***	.453***	.221***	.243***	.434***	.204*	.366***	.483***	.240***
	(.029)	(.048)	(.063)	(.038)	(.093)	(.107)	(.039)	(.069)	(.089)
Pader	-.244**	-.401**	-.093	-.242	-.377*	-.104	-.234*	-.437**	-.058
	(.124)	(.165)	(.198)	(.163)	(.212)	(.260)	(.134)	(.194)	(.240)
Female	.130	.410***	-.185						
	(.087)	(.148)	(.146)						
Constant	2.484***	1.351***	3.516***	3.089***	1.661**	3.501***	2.051***	1.419**	3.319***
	(.362)	(.487)	(.711)	(.426)	(.826)	(1.233)	(.451)	(.574)	(.999)
No. of Observations	1048	532	516	523	272	251	525	260	265
R^2	.154	.121	.033	.107	.109	.024	.212	.135	.041
p-value SFP=THR	0.1715	0.9183	0.1719	0.1158	0.1541	0.7629	0.7092	0.0791*	0.0792*

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%.

Table 4.4: Digit Span Backward Test

	6-13 All	6-9 All	10-13 All	6-13 Girls	6-9 Girls	10-13 Girls	6-13 Boys	6-9 Boys	10-13 Boys
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SFP	.424***	.485**	.394**	.572***	.659***	.513**	.304**	.306	.306
	(.125)	(.203)	(.162)	(.150)	(.230)	(.253)	(.148)	(.242)	(.188)
THR	.454***	.387**	.543***	.551***	.637***	.453*	.361**	.112	.635***
	(.133)	(.177)	(.179)	(.170)	(.243)	(.261)	(.165)	(.238)	(.211)
Age	.533***	.568***	.382***	.482***	.602***	.329**	.579***	.540***	.438***
	(.029)	(.077)	(.085)	(.036)	(.104)	(.130)	(.030)	(.101)	(.118)
Pader	.423***	.269*	.571***	.568***	.405**	.713***	.299**	.122	.459**
	(.111)	(.161)	(.159)	(.132)	(.191)	(.218)	(.139)	(.208)	(.181)
Female	-.122	.112	-.380***						
	(.086)	(.132)	(.119)						
Constant	-2.946***	-3.291***	-1.145	-2.748***	-3.660***	-1.019	-3.237***	-2.843***	-1.714
	(.319)	(.552)	(1.006)	(.389)	(.778)	(1.537)	(.336)	(.775)	(1.352)
No. of Observations	1046	531	515	522	272	250	524	259	265
R^2	.293	.119	.084	.248	.132	.065	.341	.109	.091
p-value SFP=THR	0.8233	0.6186	0.4544	0.8997	0.9295	0.8111	0.7490	0.4410	0.1709

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%.

estimate the share of test takers that passed the PLE, which is equivalent to achieving division 3 or 4 on the inverted scale. The impact on the division score is estimated using an ordered probit model, while the impact on the aggregate score is estimated by OLS. The impact on the school level share of children passing the PLE was estimated by OLS.

Table 4.5 presents the impact results for the PLE scores. Results from the school data for 61 primary schools in the sample are presented in column (1) and estimate that the THR program increased the PLE pass rate by 14 percentage points. Columns (2) and (3) present impacts on the inverted division and aggregate scores, respectively, for individuals in the household survey who took the PLE in 2005 or 2006. Only 42 children in the sample took the exam in those years, 27 in 2005 and 15 in 2006. Columns (2) and (3) show that the THR program had a significant impact on the PLE division and aggregate score for pupils who took the PLE at the end of their first year in the programs, those completing primary school in 2006. A test of equality of impacts of the SFP and THR programs on the aggregate score does not reject that the impacts were the same. There was no significant effect of the SFP program on either the division or aggregate score. As expected, the estimates show no effect of living in an IDP camp about to start the SFP or THR programs on PLE scores in December 2005.

Finally, we investigate the impacts of access to the FFE programs on the numeracy and literacy tests developed by the Education Standards Agency for this study. The tests are described in section 1.5. As noted in table 3.1, there were weakly significant baseline differences in both the upper and lower numeracy test scores between the in-school meals group and the control group. Therefore, we present treatment group difference-in-difference estimates in table 4.6. Regarding the literacy test scores, it is important to note that although the tests were piloted in the region prior to being used in this evaluation, English language skills among students in the upper primary grades, grades 5 and 6, in our sample were more limited than expected. The average baseline literacy test score for the upper level test is 11.5 out of a maximum of 100. The average baseline score for the lower primary literacy test was also low at 28.5 out of a maximum of 100.

Table 4.5: FFE Impacts on PLE Results

	(1)	(2)	(3)
	School Data	Individual Data	
	Percentage Passed PLE	PLE Aggregate	PLE Division
P6*SFP	.076	.190	.046
	(.056)	(.290)	(.525)
P6*THR	.141**	.428*	.883**
	(.061)	(.225)	(.382)
P6		-.823***	-1.398**
		(.240)	(.569)
P7*SFP		-.522	-.679
		(.363)	(.570)
P7*THR		-.251	-.537
		(.275)	(.593)
Pader	.187***	-.215	.082
	(.049)	(.283)	(.384)
Female		-.247	-.534
		(.233)	(.421)
Constant	.295***	-1.690***	
	(.035)	(.261)	
No. of Observations	61	42	42
R^2		.139	
p-value SFP=THR	0.392	0.451	0.109

Notes: Standard errors are in parentheses and are clustered at the camp level.
* significant at 10%, ** significant at 5%, *** significant at 1%.

Columns (1)-(3) of table 4.6 present the treatment group difference-in-difference impact estimates on numeracy test scores. Controls are included for the level of the test taken, the pupil's grade, age, and gender, and their district or residence[9]. We find no impacts of either program on numeracy test scores for either girls, presented in column (2) or boys, presented in column (3). The impacts of both treatments are not significantly different from one another.

The results of the impacts of access to the FFE programs on literacy test scores are presented in columns (4)-(6). We find negative impacts of access to both programs on girls' test scores. Again, the impacts of both treatments are not significantly different from one another. We hypothesis that this result may be due to several possible factors. Increased crowding in the classrooms owing to the introduction of the programs, changes in the composition of classrooms including the arrival of poorer performing children, or the disruption caused by the programs may have caused this decline in test scores. The in-school meals program required the preparation, delivery, and consumption of meals twice a day. This may have been quite disruptive to learning. The THR program was likely less disruptive but anecdotal evidence suggests that on days when the take-home rations were distributed, little schooling took place. Furthermore, although the tests were designed for pupils in grade 2, the literacy tests were much too difficult for our sample and are, therefore, not a very good measure of differences in the English language skills of our sample pupils.

4.5 The Contribution of Schooling and Nutrition

The results presented in chapter 3 suggest that in-school meals improved attendance for girls aged 6-13, while take-home rations improved the attendance of older boys, though the differences in impacts between the two programs are not statistically significant. The SFP and THR transfers in-

[9]Interaction terms between the level of the test and access to each of the programs were included in a specification not presented here and were both insignificant and did not meaningfully change any of the other estimates.

Table 4.6: Impact of FFE on Test Scores

	(1)	(2)	(3)	(4)	(5)	(6)
	Numeracy Test Scores			Literacy Test Scores		
	All	Girls	Boys	All	Girls	Boys
SFP*R2	-3.498	-8.872	.163	-4.975	-12.591**	1.418
	(4.271)	(5.379)	(4.676)	(4.383)	(5.918)	(4.195)
THR*R2	.489	-3.704	4.571	-6.026	-10.939**	-1.422
	(3.847)	(3.463)	(6.049)	(5.030)	(5.536)	(5.767)
R2	-7.086***	-3.638	-10.167***	-5.193*	-1.190	-8.879***
	(2.683)	(2.891)	(3.223)	(3.095)	(3.610)	(3.384)
SFP	-1.507	2.140	-5.466	-.265	3.873	-4.214
	(3.453)	(4.214)	(4.604)	(3.630)	(4.929)	(3.793)
THR	-1.686	-1.015	-3.470	2.050	3.250	.154
	(3.848)	(3.961)	(5.633)	(4.376)	(4.988)	(5.008)
Grade 2	-21.098***	-17.469***	-24.400***	-12.134***	-11.107***	-13.009***
	(2.396)	(2.949)	(3.881)	(1.387)	(2.450)	(2.304)
Grade 5	-14.034***	-14.411***	-14.510***	-5.286***	-5.786*	-5.350**
	(2.277)	(3.723)	(2.949)	(1.939)	(2.987)	(2.459)
Upper Primary Test	-10.489***	-14.077***	-7.719**	-17.935***	-17.098***	-18.380***
	(2.768)	(3.936)	(3.592)	(2.622)	(2.883)	(3.916)
Age	-.007	.920	-.680	.208	.326	.146
	(.500)	(.584)	(.737)	(.414)	(.482)	(.595)
Pader	-5.419**	-10.542***	-1.289	-8.083***	-9.233***	-7.243***
	(2.240)	(2.791)	(2.443)	(1.274)	(1.506)	(1.527)
Female	-5.435***			-1.734*		
	(1.504)			(.907)		
Constant	64.320***	50.068***	72.021***	36.685***	32.336***	39.428***
	(6.448)	(7.827)	(9.380)	(5.849)	(7.524)	(8.387)
No. of Observations	701	335	366	720	345	375
R^2	.251	.301	.231	.318	.343	.31
p-value SFP=THR	0.365	0.283	0.452	0.833	0.794	0.586

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. R2 is a dummy variable indicating the observation is from the resurvey.

cluded 99 percent of recommended iron requirements for school age children. Therefore, we interpret impacts of these randomized interventions on anemia prevalence to indicate a reduction in iron deficiency anemia. Reducing iron-deficiency anemia improves cognitive development in children (McCann and Ames (2007)) and improves school participation (Bobonis et al. (2006)). We find that both programs lead to large reductions in the anemia prevalence of adolescent girls, age 10-13, but had no impact on adolescent boys or on younger school-age children (Adelman et al. (2009)).

The implications for the contributions of these improvements in attendance and nutrition to cognitive development and learning are mixed. It is important to note that the only measure of nutrient deficiency we observe is anemia. Therefore, we lack information regarding other micronutrient deficiencies that affect cognition. As a result, the analysis here is speculative. We observe that in-school meals programs improve the attendance of girls, while the take-home rations program improves the nutrition of adolescent girls, as measured by anemia status. Therefore, we speculate that the observed increase in Raven's scores for girls aged 6-9 who had access to the in-school meals program resulted from their improved attendance, given we observed no improvements in their nutritional status. Moreover, we observe no improvement in girls' attendance from access to the THR program. However, we did observe an improvement in their nutrition. Therefore, we speculate that the increase in Raven's and Digit Span Forward test scores for girls aged 6-13 in the THR treatment group resulted from improvements in nutrition. We find fewer impacts of both programs on the cognitive development of boys. This is consistent with the lack of impacts of both programs on their nutrition status and fewer impacts on their attendance.

The results regarding learning are less conclusive. We do find positive impacts of the THR program on Primary School Leaving results. However, we generally find no impacts of access to either FFE program on literacy and numeracy test scores. The impacts on learning are complicated by changes in school quality that arose because of the introduction of the FFE programs.

4.6 Conclusion

Much is still unknown about how best to improve learning outcomes in developing countries. The findings of this study contribute to filling some aspects of this void. The results show that the in-school meals and take-home rations programs had significant positive impacts on cognitive development, primarily for girls. However, both FFE programs had little impact on numeracy and literacy test scores.

These results do not yet fully identify the pathways through which the improvements in learning and cognitive development occur. These effects may arise because the programs induce children to spend more time in school or because the programs improve nutritional status. Moreover, the programs may induce changes in school quality which may negatively impact learning. Future research will attempt to identify these pathways.

The evidence on the relative impacts of the SFP and THR programs on learning and cognitive development is not conclusive, though, overall, both programs seem to induce similar impacts that are not statistically different from one another. The results presented here suggest that the timing of meals provided is not nearly as important as the increased availability of nutritious food during the period when children are in school. Households with children in the THR program were apparently effectively able to smooth the child's food consumption over school days so that impacts on learning and cognitive ability were at least as strong as for children receiving the in-school meals.

Ultimately, the measure of greatest relevance to policy makers and to those designing human capital intervention programs is the relative cost effectiveness of these two programs. In-school meals programs are more expensive for schools to operate and can sometimes be disruptive to learning given the time spent, and commotion caused by, the provision of meals at school. However, the World Food Programme incurred greater costs in running the THR program because of the cost of organizing the distribution of rations to the households and the cost of monitoring school attendance, which is not required for in-school meals. Results regarding the relative

cost-effectiveness of the two programs are forthcoming.

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Chapter 5

Conclusion

The research presented in the preceding chapters of this dissertation contributes to the understanding of individual behaviour during conflict. This is achieved by studying original data of households in the conflict-affected region of Northern Uganda. The consequences of conflict and displacement on labour market participation and differences in the labour market responses of women and men are explored. A rigorous evaluation of two food for education programs often implemented by the World Food Programme in such emergency settings is also presented.

Northern Uganda has been the site of a rebel group insurgency. The conflict has had a great impact on the civilians of the region; displacing the rural population into Internally Displaced People's camps, limiting their productive opportunities, and resulting in many relying on aid for survival. The rebel group's tactics and lack of agenda lead to random attacks of the Northern population (Blattman (2006), Bøäs and Hatløy (2005), Refugee Law Project (2004), and Nabudere (2003)). In 2007, the Government of Uganda and the rebel group entered into peace talks and many households left the Internally Displaced People's camps and moved home.

I was involved in collecting data in Internally Displaced People's camps in two districts, Lira and Pader, in Northern Uganda. The data was collected in 2005, when the rural population was displaced from their homes into displaced people's camps, and in 2007, when households began moving home. The many different survey instruments described in chapter 1 allow for the investigation of numerous questions of interest regarding school feeding, education, and conflict, among others. The dissertation investigates some of these possibilities.

Limited research has investigated the labour market participation deci-

sions amongst individuals during conflict and those displaced by conflict. However, conflict and displacement are widespread and many individuals are displaced for long periods of time (IDMC (2005)). Therefore, their decision whether to work is an extremely important one and remains poorly understood.

Furthermore, disruptions to children's education and negative health shocks resulting from conflict and displacement can have severe long-term consequences. School feeding programs in emergency settings aim to reduce the likelihood and size of these negative shocks by increasing the benefits of attending school and through improved nutrition via fortified meals. In-school meals are commonly implemented by the World Food Programme amongst displaced populations. However, convincing evidence regarding their effectiveness is lacking. Furthermore, no study has examined which method of delivering school feeding is most effective within the same setting and providing the same foods. This dissertation contributes to our understanding of these issues by providing new evidence from Northern Uganda.

The main points to be taken from the findings regarding labour market participation are the strong negative impact of prolonged displacement, as measured by camp age, on the labour market participation decisions of men and the culture of idleness amongst men that develops over time in Internally Displaced People's camps. The random nature of the conflict and subsequent displacement in Northern Uganda is exploited to identify these impacts. The mechanism through which camp age influences behaviour is investigated using an instrumental variables approach. I argue that camp age is capturing social interactions in labour market participation. The rationale is that the older the IDP camp, the more time has passed for a culture of idleness amongst men to develop in that camp. The formation of an IDP camp leads to the formation of negative social capital amongst men. A similar culture has not developed among women. These findings suggest the possibility for large multiplier effects of interventions seeking to increase the labour force participation of men in displaced people's camps.

The remaining chapters of this dissertation provide solid empirical evidence of the educational impacts of two food for education programs. Joint

with my co-authors, I compare education outcomes between three randomly assigned groups: Beneficiaries of an in-school meals (SFP) program, beneficiaries of a take-home rations (THR) program providing equivalent food transfers conditional on school attendance, and a control group. The main findings are that, in general, both programs performed equally well in improving school participation. While access to both programs improved cognition, the impacts on learning achievement were weak.

The World Food Programme randomized the expansion of their food for education programs into the Internally Displaced People's camps in Lira and Pader districts. The World Food Programme generally provides in-school meals to children in emergency situations. In Northern Uganda, this consisted of a fortified mid-morning snack and lunch. In addition to this traditional in-school meals program, the World Food Programme wanted to evaluate an alternative food for education program; a take-home rations program providing equivalent food transfers as dry rations once a month conditional on a minimum level of school attendance.

The randomized design of the food for education experiment allows for the identification of the causal impacts of both the in-school meals program and the take-home rations program on education outcomes. The similarity of both programs in terms of the content and quantity of the food provided allows for the identification of differences in impacts due directly to the method of school food delivery; either as two daily cooked meals in school or as a dry ration given once a month to the household.

The results show positive impacts of the in-school meals program on primary school enrollment when we restrict the analysis to children who were not enrolled before the introduction of the FFE programs. Though only the impact of the SFP program is statistically significant, we do not find significant differences between the impacts of the two programs. Moreover, based on the results from unannounced attendance data, we find significant positive impacts of access to both in-school meals and take-home rations on morning and afternoon attendance. The results also show a weakly significant impact of both FFE programs on age at entry to primary school and a reduction in grade repetition from the SFP program for boys, but the

SFP impact is not statistically different from the THR program. Finally, we find no impact of either program on progression to secondary school. However, children in grades 6 or 7 in school feeding program schools in 2005 were significantly more likely to remain in primary school as of 2007. This suggests that school meals may have the unintended effect of increasing the time taken to complete primary school.

These results lend considerable support to the potential for FFE programs to achieve their primary goal of increasing school participation. In general, both the SFP and THR program performed similarly well. These results suggest that food for education programs remain an effective strategy for attracting children, especially girls, to school.

The evidence on the relative impact of access to the SFP and THR programs on learning and cognitive development is not conclusive, though, overall, both programs seem to induce similar impacts that are not statistically different from one another. We find significant positive impacts of both programs on three measures of cognitive development, primarily for girls. However, we generally find no significant impacts of both programs on learning achievement as measured by literacy and numeracy test scores. We do find a positive impact of the THR program on Primary Leaving Exam results.

The results do not yet fully identify the pathways through which the improvements in learning and cognitive development occur. These effects may arise because the programs induce children to spend more time in school or because the programs improve nutritional status. Moreover, the programs may induce changes in school quality which may negatively impact learning. Future research will attempt to identify these pathways.

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Appendix A

Appendix to Chapter 2

A.1 Conflict Literature

The existing literature on the impacts of conflict on individual and household outcomes focuses primarily on the outcomes of children. A brief summary of the findings of this new and growing literature are presented below. Akresh and de Walque (2008) exploit variation across provinces in the intensity of the 1994 genocide in Rwanda and find that school-age children exposed to the genocide complete almost one-half year less schooling and are 15 percentage points less likely to complete third or fourth grade.

Blattman (2008) finds that child soldiering increases political participation in Northern Uganda but it does not appear to affect non-political community participation. Blattman & Annan (2007) study additional consequences of child soldiering in Northern Uganda and find that former child soldiers' loss in schooling is about equal to the length of time of abduction into the rebel group. Furthermore, they find that child soldiering halves the likelihood of skilled employment and decreases earnings by one third but has little impact on psychological problems, aggression, and social exclusion. Akresh and Verwimp (2006) find that girls born after a shock during Rwanda's civil conflict exhibit 0.72 standard deviations lower height for age z-scores while there is no impact on boys' health status.

Merrouche (2006) finds that Cambodians who had not started attending school in 1970, the beginning of the war in Cambodia, received less education relative to the older cohort and that this difference was higher in regions where the conflict was more intense. She finds no impact of conflict intensity on earnings immediately after the war and no effect on school quality. Shemyakina (2006) evaluates the impact of the conflict in Tajikistan on

school enrollment and on the completion of mandatory schooling by adults and finds a large significant negative effect on the enrollment of girls and on the completion of mandatory schooling, and little or no effect on these education outcomes for boys. Lopez and Wodon (2005) estimate that per capita GDP would be between 25 and 30 percent higher in Rwanda in 2001 if the conflict had not taken place but they find that there was a rapid recovery in health and education after the conflict and find no reduction in growth rates resulting from the armed conflict.

de Walque (2004) studies excess mortality, fertility, marriage markets, and educational attainment in Cambodia during and after the Khmer Rouge period. He finds that excess mortality was high and heavily concentrated during the 1974-1980 period. Adult males from urban and educated backgrounds were most likely to die. Fertility and marriage was low under the Khmer Rouge but rebounded immediately after the regime collapsed. A shortage of eligible males reduced the age and education differences between partners. He also finds lower education attainment for males who were of schooling age during the interval than the preceding and subsequent birth cohorts. Bundervoet and Verwimp (2005) find that the civil war and the economic embargo in Burundi decreased the nutritional status of rural children but that these shocks did not impact the health status of urban children. Stewart (2001) finds significant negative impacts of conflict on calorie availability, doctor availability, school enrollment, and infant mortality while studying Sub-Saharan African countries from 1960 until 1990.

A.2 Gender Relations in Northern Uganda

In traditional Acholi society[1] agricultural land, livestock, and the income they generated were predominantly controlled by men. Men also made decisions about all family income including that earned by their spouses (El-Bushra and Sahl (2005), p.15). Women were responsible for domestic tasks such as fetching water and firewood, preparing meals, caring for children, cleaning, and washing. They were also responsible for smaller garden plots and livestock to be consumed by the household (Bøäs and Hatløy (2005), p.16).

Conflict and displacement have led to changes in gender roles and relations and according to El-Bushra and Sahl (2005) have also resulted in men's disempowerment (p.22). In the camp setting, women continue to perform the majority of domestic tasks while most also participate in income generating activities. In the study sample, 71 percent of women participated in some form of labour market activity in the 7 days prior to the interview date. The primary activity of 58 percent of those women was in agriculture while the remainder were casually employed brewing, collecting firewood for sale, selling food, as a porter, and performing odd jobs. Furthermore, 17 percent of women whose primary activity was farming had also performed non-farming related work in the past 7 days.

In the sample, men's labour market participation practically mirrors that of women. 72 percent of men in the sample were involved in any labour market activity in the 7 days prior to the interview, with the primary activity of 55 percent of them in agriculture. The remaining 45 percent were casually employed brick making, making handicrafts, in security, as a porter, burning charcoal, collecting firewood, and performing odd jobs.

[1]Most existing research on the conflict in Northern Uganda has focused on the Acholi people who make up the majority of those affected. This has resulted in little published work regarding the Langi people, who make up 48 percent of sample households in this study. Discussions with local individuals during data collection provided information comparing Acholi and Langi societies. Informants expressed the view that both cultures were similar with respect to structure, traditional activities, and gender relations. Therefore, a discussion of Acholi gender relations is provided here. It can be assumed that these statements also hold for Langi society.

In the camp setting agriculture appears to be practiced by both men and women while most casual employment is gender specific. Brewing is a female task while brick making, charcoal burning, security, and handicraft production are male tasks. These statistics are consistent with Bøäs and Hatløy (2005) who find that of the 6 main economic activities of displaced people (cultivating land, herding animals, brick production, charcoal production, brewing, and petty trading), only brewing, brick making and charcoal production have distinct gender divisions (p.16).

These statistics suggest a change in gender roles since displacement. In addition to their domestic tasks women's participation in the labour market is comparable to that of men. Furthermore, the World Food Programme, which provided 50-75 percent of food requirements to households in the sample at the time of data collection, only provides food rations to female household members (unless the household consists only of men and boys). So, in addition to men being 'unable' to provide for their families through traditional means, they cannot collect aid either. As such, according to El-Bushra and Sahl (2005), women have gained a certain degree of economic power (p.20). Yet these daily behaviour changes have not changed attitudes and values towards gender roles and ideologies (p.23). According to Bøäs and Hatløy (2005) (p.18), the shift in activities and any resulting changes in economic power do not appear to have empowered women. El-Bushra and Sahl (2005) come to the opposite conclusion claiming women's decision-making power has increased since displacement (p.22).

Though most research regarding the conflict in Northern Uganda emphasizes the loss of agricultural land associated with displacement (Stites et al. (2006), Bøäs and Hatløy (2005), El-Bushra and Sahl (2005)), farming still remains the primary activity performed by both men and women in the sample. Prior to displacement, land was shared among family and clan lines and was communally farmed (El-Bushra and Sahl (2005), p.14). Agricultural practices have changed significantly since displacement with camp residents largely working their plots individually (Stites et al. (2006), p.41). In the sample the majority of farming takes place on an individual's own land.

A.3 Results by District

Tables A.1 - A.4 report results for Pader and Lira districts separately for both men and women. Given that most camps formed in Pader prior to those in Lira, the concern is that the results are being driven by differences in the districts which are being captured by camp age. Tables A.1 and A.2 show that this is not the case for men. The negative impact of camp age on labour force participation remains for both Lira and Pader districts. The magnitude of the result is much larger in Lira than it is in Pader, though both are negative and highly significant.

The results for women are presented in tables A.3 and A.4. The results for Pader district suggest a positive and somewhat significant impact of camp age on labour market participation while those for Lira are negative and significant for labour market participation in the previous 30 days. The combination of the stronger negative impact of camp age on male labour market participation for Lira district and the female results suggest that the differential impact of camp age on men and women is similar in both Lira and Pader districts.

Table A.1: Camp Age and Male Labour Market Participation: Pader District

	7 Days				30 Days			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Camp Age)	-.152*	-.157*	-.129	-.173***	-.115*	-.167**	-.144**	-.154***
	(.082)	(.081)	(.079)	(.049)	(.061)	(.074)	(.073)	(.054)
HOUSEHOLD LEVEL CONTROLS								
Log(Months in Camp)		.006	.021	.024		.072***	.081**	.098***
		(.037)	(.043)	(.037)		(.027)	(.033)	(.031)
Household Size			.024***	.020**			.032**	.031*
			(.008)	(.009)			(.014)	(.016)
Miles to Home			-.016**	-.016*			-.012**	-.010
			(.008)	(.008)			(.005)	(.006)
Family Member Killed			.022	.068*			.097**	.127***
			(.035)	(.039)			(.042)	(.044)
INDIVIDUAL LEVEL CONTROLS								
Age			-.005***	-.004**			-.007***	-.006***
			(.002)	(.002)			(.002)	(.002)
Literate			-.085	-.082			-.041	-.044
			(.070)	(.065)			(.051)	(.056)
CAMP LEVEL CONTROLS								
Diversity of Camp Residents				.048				.088
				(.065)				(.058)
Camp Population				.058**				.014
				(.026)				(.026)
Miles to Town				-.001				-.0005
				(.003)				(.002)
Road - local				.058				.041
				(.059)				(.058)
Road - community				-.132*				-.047
				(.070)				(.058)
Mean Killed				-.871***				-.592***
				(.203)				(.217)
Constant	1.295***	1.290***	1.353***	1.916***	1.223***	1.158***	1.155***	1.424***
	(.301)	(.308)	(.310)	(.316)	(.220)	(.207)	(.193)	(.239)
No. of Observations	311	311	311	311	311	311	311	311
R^2	.025	.025	.074	.136	.017	.023	.093	.123

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are weighted by the camp population divided by the number of individuals sampled per camp. Diversity of camp residents is a dummy variable equal to one if most residents of the camp are from the immediate surrounding area (within 3 miles). Camp population is in tens of thousands of residents. Mean killed is the percentage of sample households by camp reporting having an immediate family member killed as a result of the insurgency. Road-local and road-community are types of roads providing access to the camp. The omitted category is federally-maintained road.

Table A.2: Camp Age and Male Labour Market Participation: Lira District

	7 Days				30 Days			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Camp Age)	-.718***	-.702***	-.702***	-.706***	-.500***	-.488***	-.525***	-.574***
	(.189)	(.193)	(.189)	(.153)	(.109)	(.114)	(.138)	(.121)
HOUSEHOLD LEVEL CONTROLS								
Log(Months in Camp)		-.022	-.009	-.019		-.016	-.013	-.015
		(.026)	(.030)	(.040)		(.035)	(.034)	(.036)
Household Size			.013	.012			.006	.006
			(.012)	(.012)			(.016)	(.017)
Miles to Home			.008*	.009*			.001	.001
			(.005)	(.005)			(.006)	(.006)
Family Member Killed			.149***	.138**			.156**	.142**
			(.052)	(.056)			(.068)	(.071)
INDIVIDUAL LEVEL CONTROLS								
Age			-.003	-.003			-.003**	-.003**
			(.002)	(.002)			(.002)	(.002)
Literate			.212***	.210***			.006	.001
			(.069)	(.068)			(.096)	(.098)
CAMP LEVEL CONTROLS								
Diversity of Camp Residents				.050				.040
				(.052)				(.036)
Camp Population				-.005				-.018
				(.020)				(.012)
Miles to Town				.003				-.001
				(.003)				(.001)
Road - local				-.028				.013
				(.061)				(.033)
Mean Killed				.029				.291*
				(.286)				(.166)
Constant	3.161***	3.177***	2.875***	2.849***	2.505***	2.517***	2.622***	2.684***
	(.623)	(.620)	(.526)	(.432)	(.366)	(.365)	(.507)	(.474)
No. of Observations	301	301	301	301	301	301	301	301
R^2	.121	.122	.206	.21	.076	.077	.124	.134

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are weighted by the camp population divided by the number of individuals sampled per camp. Diversity of camp residents is a dummy variable equal to one if most residents of the camp are from the immediate surrounding area (within 3 miles). Camp population is in tens of thousands of residents. Mean killed is the percentage of sample households by camp reporting having an immediate family member killed as a result of the insurgency. Road-local is a type of road providing access to the camp. The omitted category is federally-maintained road. There are no community roads in Lira district.

Table A.3: Camp Age and Female Labour Market Participation: Pader District

	7 Days					30 Days		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Camp Age)	.095**	.085	.098	.145***	.056*	.043	.059*	.054
	(.043)	(.059)	(.063)	(.047)	(.029)	(.034)	(.035)	(.036)
HOUSEHOLD LEVEL CONTROLS								
Log(Months in Camp)		.015	.016	.012		.019	.016	.011
		(.050)	(.056)	(.057)		(.029)	(.030)	(.030)
Household Size			.0004	.0005			.001	.0005
			(.013)	(.014)			(.012)	(.011)
Miles to Home			-.004	-.004			-.007	-.008
			(.005)	(.006)			(.005)	(.005)
Family Member Killed			.003	.005			.016	.015
			(.045)	(.045)			(.034)	(.037)
Single-Headed			-.039	-.042			-.066*	-.070
			(.078)	(.081)			(.039)	(.043)
INDIVIDUAL LEVEL CONTROLS								
Age			-.0006	-.001			-.002*	-.002
			(.001)	(.001)			(.001)	(.001)
Literate			-.053	-.056			.007	.011
			(.084)	(.086)			(.056)	(.058)
CAMP LEVEL CONTROLS								
Diversity of Camp Residents				.073***				.012
				(.027)				(.030)
Camp Population				.039				.022
				(.025)				(.019)
Miles to Town				-.0009				.0002
				(.001)				(.001)
Road - local				-.131***				-.004
				(.032)				(.026)
Road - community				-.125***				.017
				(.040)				(.047)
Mean Killed				.070				.105
				(.152)				(.127)
Constant	.369**	.355**	.365**	.198	.655***	.637***	.699***	.619***
	(.163)	(.162)	(.183)	(.205)	(.106)	(.109)	(.150)	(.153)
No. of Observations	371	371	371	371	371	371	371	371
R^2	.01	.011	.016	.03	.006	.007	.031	.036

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are weighted by the camp population divided by the number of individuals sampled per camp. Diversity of camp residents is a dummy variable equal to one if most residents of the camp are from the immediate surrounding area (within 3 miles). Camp population is in tens of thousands of residents. Mean killed is the percentage of sample households by camp reporting having an immediate family member killed as a result of the insurgency. Road-local and road-community are types of roads providing access to the camp. The omitted category is federally-maintained road.

Table A.4: Camp Age and Female Labour Market Participation: Lira District

	7 Days					30 Days		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Camp Age)	-.028	-.049	-.036	-.130	-.143	-.132*	-.152	-.250**
	(.130)	(.109)	(.131)	(.093)	(.099)	(.077)	(.093)	(.098)
HOUSEHOLD LEVEL CONTROLS								
Log(Months in Camp)		.030	.029	.032		-.016	-.013	-.006
		(.068)	(.072)	(.072)		(.066)	(.066)	(.062)
Household Size			-.003	.002			-.012	-.009
			(.015)	(.016)			(.012)	(.012)
Miles to Home			-.002	-.002			.0009	.002
			(.008)	(.008)			(.006)	(.006)
Family Member Killed			-.056	-.066			-.007	-.028
			(.066)	(.076)			(.083)	(.086)
Single-Headed			-.049	-.036			-.015	-.007
			(.067)	(.067)			(.061)	(.058)
INDIVIDUAL LEVEL CONTROLS								
Age			-.0004	-.0007			-.002	-.003
			(.002)	(.002)			(.002)	(.002)
Literate			.011	-.009			.004	-.011
			(.059)	(.064)			(.052)	(.057)
CAMP LEVEL CONTROLS								
Diversity of Camp Residents				-.044				-.014
				(.034)				(.032)
Camp Population				.027***				-.009
				(.009)				(.010)
Miles to Town				-.008***				-.009***
				(.002)				(.002)
Road - local				.111**				.095**
				(.046)				(.038)
Mean Killed				.661***				.741***
				(.185)				(.185)
Constant	.845**	.820*	.865	.782**	1.314***	1.327***	1.547***	1.570***
	(.431)	(.465)	(.551)	(.375)	(.326)	(.363)	(.461)	(.362)
No. of Observations	358	358	358	358	358	358	358	358
R^2	.0002	.001	.008	.038	.007	.007	.016	.049

Notes: Standard errors are in parentheses and are clustered at the camp level. * significant at 10%, ** significant at 5%, *** significant at 1%. Regressions are weighted by the camp population divided by the number of individuals sampled per camp. Diversity of camp residents is a dummy variable equal to one if most residents of the camp are from the immediate surrounding area (within 3 miles). Camp population is in tens of thousands of residents. Mean killed is the percentage of sample households by camp reporting having an immediate family member killed as a result of the insurgency. Road-local is a type of road providing access to the camp. The omitted category is federally-maintained road. There are no community roads in Lira district.

A.4 Social Capital Questions

I am now going to read you a series of statements. Please tell me if you disagree, neither agree nor disagree, or agree with each one.

IF THE RESPONDENT SAYS EITHER AGREE OR DISAGREE, ASK THEM WHETHER THEY DO SO STRONGLY OR SLIGHTLY.					
STATEMENT	Strongly disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Strongly Agree
19. Most younger people can be trusted.	1	2	3	4	5
20. Most older people can be trusted.	1	2	3	4	5
21. Most people in this camp can be trusted.	1	2	3	4	5
22. Most people in the nearby town can be trusted.	1	2	3	4	5
23. Most people are helpful.	1	2	3	4	5
24. Most people try to be fair.	1	2	3	4	5
25. I believe that the government does what is right for the people.	1	2	3	4	5
26. I am confident in the ability of government officials to do their jobs.	1	2	3	4	5
27. I am confident in the abilities of teachers to teach my children.	1	2	3	4	5
28. I can trust my neighbours to look after my house if I am away.	1	2	3	4	5
29. I would ask my neighbors to take care of my children for a few hours if I was sick.	1	2	3	4	5
30. My life is determined by my own actions.	1	2	3	4	5
31. People in this camp get along well these days.	1	2	3	4	5
32. I feel close to the people in this camp.	1	2	3	4	5
33. In this camp, it is generally expected that people will volunteer or help in community activities.	1	2	3	4	5
34. The army is honest and can be trusted.	1	2	3	4	5
35. This camp is safe from the LRA.	1	2	3	4	5
36. There is not a lot of crime inside the camp.	1	2	3	4	5
37. The government can protect members of my household from crime and violence.	1	2	3	4	5
38. I feel safe walking to town.	1	2	3	4	5
39. I feel safe within 1 mile of the camp.	1	2	3	4	5
40. I feel safe going home (where I lived before being displaced).	1	2	3	4	5

Figure A.1: Social Capital Questions

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