It Takes a Farmers' Group to Raise a Child: The Impacts of Local Social Networks on Child Health Outcomes in Ugandan Internally Displaced Persons Camps

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Abstract:

Long term economic development depends on household investments in children's human capital. Social networks can affect demand for human capital investments by relaxing household time or budget constraints or by defining and reinforcing human capital preferences. Rebel activity in Northern Uganda, which forced households into Internally Displaced Persons camps, disrupted pre-existing social networks in ways that were exogenous to household human capital investment preferences. This paper uses the exogenous variation in network disruption to identify the impact of networks on child health outcomes. Using household survey data from the Uganda School-Based Feeding Evaluation, household data collected by the author, and administrative data from the World Food Programme and local governments, I show that an increase in the average household's network size by one household improves height-for-age z-scores by .27 standard deviations for children born in the camp.

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1. Introduction

Local social networks – the people that a household spends time with on a daily basis – can critically influence time-sensitive household behaviors. In particular, these local networks may affect the level of households' daily investments in children's nutrition, which is heavily affected by the interaction of time-consuming care-giving practices and food and health resource availability. As the lasting benefits of child health production, which include improved adult health, educational attainment, cognitive function and productivity, require consistent investments during critical growth periods, local social networks may significantly improve a household's future welfare. However, empirically identifying network effects is complicated because unobservable household characteristics that affect a child's health, or other outcomes, may also determine the household's network choice. This study uses an exogenous disruption to households' social networks, caused by a rapid escalation of a long-standing civil war, to identify how the presence of households' networks impacts nutritional outcomes of the households' youngest members. I use data from Internally Displaced Persons (IDP) camps in Northern Uganda collected in 2005 and 2007.

Recent empirical work has demonstrated the importance of a household's social network to a number of economic outcomes and decisions, such as access to employment (e.g. Topa, 2001; Ioannides and Loury, 2004), participation in social programs (Bertrand et al. 2000; Aizer and Currie 2004), and retirement investment decisions (Duflo and Saez, 2003). In developing countries, the role of social networks may be more important as a means of overcoming market failures or the absence of other institutions. Trust relationships function in the absence of contract-enforcement mechanisms (Greif, 1993; Fafchamps, 1995), and networks provide insurance and credit systems where formal markets do not (Rosenzweig, 1988; Besley, 1995; Townsend, 1995; Grimard, 1997). Finally, networks are a significant source of information about technology, health care, and returns to investment (Conley and Udry, 2005; Leonard, 2007; Yamauchi, 2005).

In this paper, I examine the impact of local social network size on households' nutritional investments in very young children. A households' social network in general can influence the households' ability to make nutritional investments by expanding the household resource pool or reducing investment risks. *Local* social networks can also increase the demand for child nutritional investments in ways that require more frequent contact, such as through coordinating daily activities and framing and reinforcing certain preferences. For example, members of sufficiently large localized networks benefit from economies of scale in human capital production by sharing child care and home production activities. Local social networks also can increase the demand for nutrition by restricting the household's resource allocation choices to those that are potentially better for young children. As the network grows, the ability of the network to monitor and reinforce these norms and the possibilities for coordination also increase. Such constant influences on human capital demand are critical to ensuring future benefits of early childhood nutrition given the time-sensitivity of nutritional investment.

Studies of social networks' relationship to any outcome or household behavior suffer from serious identification problems stemming from the fact that households are not assigned to networks, but choose whether to join, choose whether to live in places where there are networks, and choose whether to form networks. Some unobservable aspects of a household's ability to invest in child health, such as income, access to formal credit, or preferences for child health or health knowledge, may be correlated with the household's ability to form and maintain networks. Moreover, measuring the size of the network that might influence health demand is difficult. Some past studies have used neighborhood or ethnic group to proxy for the network (for example, Bertrand et al., 2000; Aizer and Currie, 2004) however, not all members of a neighborhood or ethnic group may influence a household's demand for health, introducing an errors-in-variables problem.

I overcome both problems by relying on exogenous disruptions to households' self-selected networks. In Northern Uganda, the civil war that forced households into IDP camps significantly disrupted all aspects of families' lives, including whether they ended up living near the people with whom they had previously shared their lives. Some households ended up with relatively smaller social networks for purely exogenous reasons. Because the civil war spread unpredictably over the region, households were forced to move to IDP camps at different times and under different circumstances. Villages that were in areas of heavy fighting moved to the camps first and were generally more likely to find space to build with friends and family. These households typically suffered less disruption to their networks. However, within months of the start of heavy fighting, the military evacuated the remaining villages, giving households 48 hours to move into camps. The chaos associated with such a large influx into the camps made coordination with friends and family virtually impossible. Moreover, households arriving later had to squeeze into remaining spaces, which were often not large enough to accommodate more than one or two huts. Thus, maintaining previous local networks was very difficult for these households as they were unlikely to live near members of the network.

The variations in disruption were exogenous to household preferences and characteristics, and therefore represent an ideal instrument for measuring the disruption to social networks. I measure the impact of exogenous changes in the size of the social networks on outcomes determined after these network changes took place.[1] In Northern Uganda, farmers' groups share daily farm tasks and meals, hence providing advice and support while reinforcing social behaviors and group preferences on a daily basis. Households can easily recall in an interview the original group members and where they lived during displacement, so the disruption to this group provides an excellent indicator of social network fragmentation. I use village-level disruption measures to instrument for the farmers' group disruption.

Early childhood nutrition is vital to economic development in extremely poor countries. The largely irreversible damages of early childhood undernutrition cause lower lifetime educational attainment, poorer cognitive development and lower adult productivity. While the civil war, which forced nearly all of the rural population into these camps between 2002-2007, may be ending (during the recent cease-fire, many households did return to their homes), nutrition in the camps was so poor that it could slow the pace of economic development as the generation born in camps reaches adulthood.

[1] Costa and Kahn (2007) employ a similar strategy by using exogenous disruptions to a preformed network to identify the effect of network size on survival in a POW camp.

While nutrition in camps, particularly among very young children, was low, it also was highly variable. Since income and access to resources was relatively uniform across households (households were almost exclusively dependent on food aid, which was provided to all resident households based on household size), the variation in outcomes did not depend on household resources. Variations in social network size in the camp explain part of these patterns.

I infer variations contributions to child health and nutrition from variations in children's height-for-age z-scores (HAZ). HAZ is a cumulative indicator of nutritional status and, for preschool-age children, is a function of lifetime dietary intake and morbidity, and genetics. Local network size can positively impact HAZ by increasing household demand for nutritional and health inputs. I find that an increase in local network size of one household leads to a .27 standard deviation improvement in HAZ. For the average child in this sample, this improvement is equivalent to moving from the 8^{th} percentile in height to the 13^{th} percentile and would translate into 1 cm of growth for a 36-month-old, or about 1.1 percent growth for the median male 36-month-old, an increase that has proven sufficient for significant gains in adult welfare.

This paper is organized as follows. In Section 2, I provide background on Lango and Acholi social institutions and the importance of farmers' groups to child rearing. Additionally I present an introduction to the civil war and resulting displacement, provide evidence of the exogenous nature of network disruptions, and describe camp conditions. Section 3 describes the methodology. Section 4 presents estimates of social network impacts on nutritional investments of children born in the camp. Section 5 tests the exogeneity of the instruments by regressing pre-determined outcomes on the instrumented network. Section 6 concludes.

2. Background: Farmers' Groups, and Civil War and Displacement

This study was conducted in IDP camps in Lira and Pader Districts in Northern Uganda, which are part of the Lango and Acholi tribe sub-regions, respectively.[2] Households were forced into IDP camps due to attacks by the rebel group, the Lord's Resistance Army, and due to the subsequent fighting between rebels and the military, the Ugandan People's Defense Forces (UPDF). IDP camps, unlike refugee camps, are government-run camps for the country's own residents. They are not under the protection or control of the UNHCR, though in recent years the UNHCR has aided in camp management. Camp residents are nearly entirely food-aid-dependent, receiving 50-75 percent of their estimated household food needs from the World Food Programme. Other NGOs also provide support, but not universally. The region is largely agrarian, though income-generating activities in the camps are mostly limited to charcoal sales, beer and cake sales, and tailoring. In some areas, particularly in Lira, households could leave the camps during restricted hours for cultivation, though rebel activity was typically highest just before and during harvest times.

2.1 Farmers' Groups in Lango and Acholi Regions

[2] Nearly all inhabitants of Pader are Acholi and nearly all inhabitants of Lira are Lango. Lira and Pader share a border, and in the border camps, Omot and Okwang, included in this analysis, there may have been mixing of Acholi and Lango tribes. Camps are mostly homogenous, however, and tribe affiliation does not drive the results.

Acholi and Lango farmers' groups (*e.g. Alulu*, *Gede*, and *Awak*), in which groups of households take turns working on each others' fields, are an adaptation to the labor-intensive needs of staple crops in the region. Groups also provide security, as larger groups were less likely to be targeted by rebel or enemy groups (Tosh 1978; Stock 2004). Similar farmers' groups are common throughout sub-Saharan Africa, particularly in East Africa. In some areas, they have been phased out due to changes in crops or introduction of physical capital that can replace heavy labor. In the Acholi and Lango regions, farmers' groups were common up to displacement; 80 percent of the sampled households belonged to a farmers' group in the year before displacement.

Since work is reciprocal, farmers' groups are a stable collection of trusted households (on average 11 households in this sample). In fact, the shared work "reaffirms the interdependence of the group" (Stock 2004), whose functions extend beyond farm work. The beneficiary of shared labor on a given day is responsible for providing meals and beer for the rest of the group. Hence, farmers' groups serve as a social group involving entire households, not simply workgroups of adults. During qualitative interviews, respondents in Lira and Pader reported that the farmers' group members were the people that they spent the most time with in the village and relied on for advice and support in raising children. Close friends, such as those from a farmers' group, also disciplined children directly.

In Lango and Acholi villages, social networks in general, and farmers' groups in particular, are an important means of monitoring children and spouses on a daily basis.[3] Neighbors help to discipline children and networks gather in the evenings when elders sanction bad behavior on the part of parents, children or spouses and provide advice on childrearing, marriages, and household finances. This institution requires daily contact with others from the village who may report bad behavior or concerns to village elders. And, as Lango and Acholi villages are highly dispersed, the farmers' group is an important means of having daily contact with neighbors.

The institution, therefore, provides an opportunity for group members to observe households' interactions with children and to provide advice about childrearing. The average respondent household sampled for extensive interviews reported receiving advice on childrearing from 77 percent of farmers' group members and reported that farmers' group members saw their children on average 5.4 days per week in the village. Seventy-three percent of households report that at least one of the most important influences in how they raised their children was part of their farmers' group. Nearly 40 percent of households reported that all of their main influences in child rearing were part of their farmers' group.

2.2 Displacement

The civil conflict, which began in neighboring districts in the mid-1980s, forced nearly all rural households in Lira and Pader Districts into IDP camps between 2002-2003. In Pader, some households were displaced due to direct attacks, but the majority of households were not displaced until October 2, 2002, when the government forced remaining households into the camps with 48 hours notice. The rebel army then unexpectedly began to attack villages in Lira,

[3] The average pre-displacement village size was 306.5 (63.4 households) (Census 2002). While focus group participants said that they knew all of their village mates prior to displacement, the farmers' group was a subset of the village that the household knew very well and spent a lot of time with.

driving these households into camps or trading centers that would later become camps. In both instances, the speed of displacement, coupled with the fact that Lango and Acholi live on the land that they cultivate and hence typically live a kilometer or more from the nearest neighbor, prevented coordination between households in determining which camp to go to and where in the camp to build. Certainly, villages as a whole could not coordinate within a camp.

Camps varied in size and the number of villages that they hosted (Table 1), but most households interviewed chose to go to the nearest camp rather than choose a camp based on its size, diversity or access to services. Compared to the villages, camp populations were very large, ranging from 3600 to more than 40000 people (approximately 850 to 9500 households) (see Table 1). On average, camps hosted about 55 villages, but some larger camps hosted households from well over 100 villages. Most camps formed administrative "blocks" with geographic boundaries. On average, these blocks consisted of approximately 235 households, though the average size varied from camp to camp.

Displacement experiences varied significantly for households depending on exogenous factors such as camp topography, household's distance from a camp, degree of local insecurity, and camp management. For example, in Corner Kilak, villages from the west were displaced in 1997 and lived scattered throughout the camp. In 2002, the eastern villages came to the camp. However, despite the camp population growing by 5 times (from roughly 450 households to over 2300 households), the UPDF tightened the protected borders of the camp and so even households that moved to the camp in 1997 had to relocate within the camp, and thus could be equally dispersed from their pre-displacement network as the newcomers.

In Arum Camp, villages on or near rebel routes were less fragmented in the camp than those farther away from rebel routes. While reconstructing exact events is difficult, it seems that households in these villages were forced into the camp slightly sooner and hence arrived at the camp when there was still sufficient land to build several huts together. Those coming later needed to "squeeze in" amongst other huts. The proximity of a household to rebel routes is entirely exogenous, so resulting impacts on network concentration are also exogenous.

Displacement experiences also varied in potentially endogenous ways. Most notably, households that had relatives owning land in the camp could often move onto the relative's land, provided the land was not already full. In my data, 10 percent of children lived on relatives' land. Wealthier households, usually teachers' households, may have had the means to move into larger towns rather than camps to escape the war. Some of these households did return to the camps later, though, when the government ordered local civil servants back to the region around 2005 (4 percent of my sample has a teacher in the household).

However, the variations in village-level fragmentation were exogenous. These variations arose from the timing and severity of rebel activity, but varied from camp to camp. For example, in some camps, arriving late meant that a village would become more displaced (*e.g.* Agweng). In other camps, the UPDF expanded the border of the camp to accommodate late-arriving villages (*e.g.* Pajule), so these villages may have been more likely to stay together. But, the security situation around the camp, which is exogenous, determined whether or not a camp could expand, not characteristics of the villages or households that were displaced.

While camps were small in area (the largest camp was 1.2 miles at its widest), the population density made seeing friends harder. Rather than seeing farmers' group members daily, respondents saw farmers' group members on average 5.2 times per week (CI= 4.9 to 5.5). However, fragmentation mattered to how often respondents saw the former network. Adults in the respondent households saw members of their farmers' group living in the same block on average 6.3 days per week, while they saw members living in other blocks only 4.4 days per week (t-statistic on the difference = 19.47). Sharing a block was also important to the number of days that farmers' group members saw respondents' children. Those living in the same block saw respondents' children on average 6.1 days per week, while those living in other blocks saw children 3.9 days per week (t = 19.62).

I conducted focus groups with women from several camps about the effects of displacement on network strength and about challenges in raising children in camps. In general, people reported that they did maintain contact with their pre-displacement networks while in the camps, but that contact was infrequent. In particular, lack of contact with elders, who "guide family characteristics" in the village, was noted as a problem. In Lira Palwo, a mother told me that "in the village, elders restricted drinking time, here [there is] no village leadership to restrict behavior." And in Paimol, women complained that "now in the camps, there are no fireplaces to gather around. No monitoring by elders. The uncles just assume that everything is ok and people get forgotten about."

The lack of contact with village mates posed challenges to raising children. For example, a woman from Aloi complained that "the people who used to help in disciplining children were few; the newer neighbors would not discipline your children whereas in the village anyone would." A universal concern among the mothers was child care. Most did not trust their neighbors in the camps to help out with children in an emergency. Women also spoke of needing to go to other blocks to find child care and that monitoring children's behavior was difficult with so little support.

2.3 Living conditions and health care access in camps

Sanitation and health care access was fairly uniform within camps due to their small area. For example, all camps had a drug shop and health clinic within the camp perimeter with the exception of Alebtong in Lira District, which had both within a quarter mile of the camp.[4] Access to a hospital was more difficult as only Kalongo in Pader had a hospital within its perimeters; the average distance from the remaining camps to the nearest hospital was 25 miles. Insecurity and transport costs may have limited access to hospitals, but 98.5 percent of respondents reported that they knew of a hospital that they could reach in an emergency.

While camp residents had access to health care facilities, there was a large variation in the number of health care workers and their days of availability. All camps except for Omot had at

[4] This information is based on reports by camp officials in a camp questionnaire administered in 2005. Alebtong officials did not report the presence of a health facility within the camp, but UNICEF operated a large health facility on the border of the camp while the camp was operating. The facility did not operate every day, but was staffed at least weekly.

least one government-trained community health care worker (COBS) available all or most days. COBS can dispense common medicines such as anti-malarials or antibiotics. A doctor, nurse or paramedic was available on most days in all but four camps, but on average, camps had only one doctor per 5160 residents. In Atanga and Apala, there was only one doctor per more than 12,000 residents. As 39% of children sought medical attention in the 30 days leading up to the interview date, medical treatment was in high demand. Parents and camp officials often complained that access to medical care was insufficient.

Nearly all households lived in thatched-roof huts with earth or earth and dung floors. Nearly 80% of households had unburnt brick walls, while 17 percent had mud and wottle walls. Most of the remaining households lived in semi-permanent buildings with tin roofs and burnt brick walls.

Overall camp sanitation conditions varied substantially due to camp size, density, management and aid projects. For example, an NGO operating in northeast Pader had consistent, but unexplained, problems with sanitation in Wol camp, which is a small, rural camp, because they could not find residents willing to maintain latrines. Agweng camp, a large camp built in a trading center, was also notorious for poor sanitation and disease outbreaks. However, these problems were typically camp-wide problems and therefore affected all residents in a camp, rather than only those in a certain block. Very few camp leaders reported problems specific to individual "notorious" blocks, which included overcrowding, a large number of domestic disputes, and recent fires. The majority of environmental variation that could affect health outcomes over the long term, however, was at the camp level and can be accounted for in estimations with camp-level dummies.

3. Methodology

3.1 How do local social networks impact child health?

Marginal increases in early childhood nutritional investments, especially when nutrition levels are low, can provide tremendous future gains through adult health, cognitive function and productivity. However, since payoffs are in the future and uncertain, households may not have an incentive to make more than the minimal investment in child nutrition today. Local social networks play a role in increasing investments in child nutrition. While this paper does not attempt to explain all mechanisms through which local networks matter to child health outcomes or to identify the particular mechanism at play, below I present some ways in which networks can affect demand for child health. The first example discusses how networks can reduce the cost of child health production. In the other examples, networks serve to restrict parents' spending on private goods in favor of contributing to the household public good, child health.

Reducing the cost of health production through economies of scale

Local networks can reduce the cost of investing in child health and child care by providing daily support to parents. Local networks can work together to share child care, cooking, and other household tasks. For example, 53 percent of the sample provided meals to a child from another household and 25 percent of the sample sent a child to eat elsewhere at least once in the week before the interview.[5] Sharing responsibility for care of some children can free up resources to

[5] Twenty-five percent is likely an underestimate as "no" was recorded if a parent did not know if the child ate elsewhere.

spend on food and health care. Similarly, sharing responsibilities can reduce mothers' time demands, freeing more time to care for young children.

Overcoming time-inconsistent preferences: networks as a commitment mechanism
While the effects of major changes in nutritional investments are quickly apparent, the effects of marginal changes in investments may not be apparent until a child reaches adolescence or even adulthood. Parents with time-inconsistent preferences, therefore, may find it difficult to make the small, but daily, investment increases necessary for lasting benefits without realizing an immediate payoff. While parents want the future benefits of current nutritional investments in their children's health, they may choose consumption with an immediate payoff instead. The same problem has been documented in the savings and credit literature in which households fail to save (or repay loans) in the absence of some commitment mechanism (for example, Laibson, 1997; Ashraf, Karlan, and Yin, 2007). As shown with Roscas and group lending schemes, social networks act as a commitment mechanism (recently, Gugerty 2007). Networks can also form to ensure commitment to human capital investments. Network members can agree on how much to contribute to their children's health and how much to spend on personal consumption and then ensure others' commitment through sanctioning inappropriate spending. The use of monitoring and sanctioning in Africa is documented in the context of public goods (Gugerty and Miguel 2005), Rosca commitments (Gugerty 2007), credit (Udry 1990), and business relationships (Fafchamps 1995).

Qualitative data show that network members in the village are highly influential to how people choose to raise their children. If this influence stems through a commitment mechanism (versus learning, for example), then the continued presence of the network would be necessary to ensure the investments. In fact, block leaders in Paimol camp said that a major challenge to raising children in the camp was not being able to agree on how to raise children with neighbors from other villages, suggesting that networks not only form as a child-rearing mechanism, but that the absence of the mechanism is problematic.

Overcoming intra-household information asymmetries: reporting on a spouse's consumption
Networks may also serve to reveal information asymmetries within the household that lead to an under-provision of human capital investments. In the collective household framework, household demand predictions are equivalent to the solution of a household utility maximization problem in which spouses pool income and determine the allocation of *total* household resources to household public goods. The model thus predicts an efficient allocation of resources to public and private goods (for example, Blundell et al., 2005). Since partners pool resources, make contributions to the public goods and then divide the remainder for private consumption, they are able to overcome potential intra-household free-rider problems that would lead to an under-investment in child health.

The Pareto efficient result relies on accurate disclosure of personal income and utility inside and outside the marriage. However, an individual would be able to capture a larger share of the gains from marriage by under-reporting the utility he or she receives. In Africa, men and women attempt to increase personal utility within the marriage by hiding some personal income, which can be used according to the individual's utility function rather than the household's. Since many jobs, even in agricultural sales, are gender-specific, spouses do not necessarily know how much the other earns.[6] Moreover, short of following the spouse throughout the day, that spouse's personal consumption is also unobservable. Therefore, one spouse cannot even deduce the other's income and thus cannot force him or her to reveal the total income. This problem was noted by women in Alanyi Camp who said that they pooled their incomes with their husbands for household expenses, but that they had difficulty forcing their husbands to contribute sufficiently. One woman also said that the problem was complicated because she did not know what her husband spent his income on because he "moves about alone."

Expenditure on child welfare is observable to both husband and wife, and therefore, if either partner hides income, they are likely to direct it to private, not public consumption. Thus, when spouses do not fully reveal income, child health is likely under-provided. Household-level demand for child health is increasing only in revealed resources, so demand for child health decreases as income hiding increases. Parents may individually spend some of their hidden resources on child health. However, since child health is a public good, and the parent's individual utility function does not take into account the other parent's utility for child health, the individual-utility maximizing parent will provide less child health from hidden income than if the same amount were revealed in the household demand problem.

The social network can reduce the amount of income that one spouse hides by reporting on his or her private consumption to the other spouse. While income and expenditure may be largely unobservable to a spouse, expenditure can be observed by a sufficiently large local network. Everyone in the network wants information about their own spouse's consumption, so they also provide information to other network members. As the size of the network increases, the information provided to a spouse about private expenditures and hence true income also increases, increasing the amount of income that the spouse must reveal and hence increasing the resources available to for child health provision.

3.2 Empirical Strategy

3.2.1 Anthropometry as an indicator of health and nutritional investments

In this analysis, I use variations in children's height-for-age z-scores (HAZ) to reveal variations in household investment in child nutrition. HAZ is calculated by comparing a child's height to the height distribution of a healthy reference population of the same age (in months). The z-score is the number of standard deviations that the child's height falls from the median height in this distribution. While there are several anthropometric z-scores that provide various indications of children's nutritional status, HAZ is an indicator of a child's nutritional history. In other words, it is a cumulative measure of nutritional gains or deficits throughout critical developmental periods. Since I expect that social networks impact the level of child health and nutrition inputs on a continual basis, HAZ is the best outcome for detecting the effects of the social network on these contributions.

Child growth is a function of nutritional inputs, infection and genetics. Genetic factors impact how efficiently the body uses nutrients to fight infection and to form new tissue for growth. Less

[6] Based on field interviews and focus groups. Also see Dagnelie and LeMay-Boucher, (2008) regarding hiding income and Goldstein (1999) regarding unknown earnings.

exposure to infection or greater efficiency in fighting infections, which relies on nutritional status, health inputs from parents, and genetics, improves the child's growth capability as nutrients are not being diverted to fight the infection. Exposure to infection depends on the physical environment and contact with others with infection. Households can influence their children's growth by varying the nutritional and health inputs and, to some extent, by varying exposure to infection. After controlling for genetic factors and the disease environment, systematic variations in HAZ can be interpreted as variations in a household's health and nutrition contributions. Local social network size can positively influence growth by increasing the household's contributions to nutrition and health.

3.3.2: Identifying the impact of social networks

Identifying the impact of any network attributes on household behavior is problematic because households choose the qualities of their networks.[7] As discussed above, some unobservable features of network size and composition may be correlated with a household's demand for child health. For example, households with a stronger preference for child health may also put more effort into forming and maintaining social networks. Or, network members may seek out households that are better able to manage resources, access services, or produce healthy children. Hence, network impact estimates may pick up demand for child health that would exist even in the network's absence.

I overcome the problems associated with endogenous group formation by measuring the size of the local network after displacement into IDP camps exogenously fragmented households' pre-formed networks. The nature of the civil war and government's response to rebel activities forced households into IDP camps where the likelihood of living in close proximity to pre-displacement network members was mostly random. Because this disruption may have endogenous and exogenous components, I instrument for the household-level disruption with village-level disruption measures. Using the instrumented network, I can identify local network effects on health outcomes that were determined entirely after the disruption to the network took place.

I define the local network size as the number of households from the pre-displacement network living in the respondent household's block (BLKNET). As shown above, shared block membership is highly correlated with the frequency of respondents' contact with its pre-displacement network members. BLKNET is equal to the original network size (OLDNET) minus the exogenous disruption to the network (δ). If δ is entirely exogenous, then BLKNET=OLDNET-δ will also be exogenous, conditioned on the original network size (OLDNET), and α can be estimated consistently in the following equation:

$$HAZ_{ijk} = BLKNET_{jk}*\alpha + OLDNET_{jk}*\beta_1 + X_{ijk}*\beta_2 + CAMP_k*\lambda + \varepsilon_{ijk}. \qquad (1)$$

In this equation, HAZ_{ijk} is the HAZ of child i in household j and camp k, X_{ijk} is a vector of child and household characteristics, and $CAMP_k$ is a vector of camp dummies.

[7] See Manski (1993).

Certainly, within the camp, some households may have been more or less adept at forming new friendships that could serve in the same capacity as households from the original network or more or less adept at maintaining contact with network members assigned to other blocks, which could introduce measurement error into the local network size variable, biasing the estimates downward. Additionally, some households may have been able to coordinate with network members during displacement to live nearby. If these households also had similar preferences for child health, then again estimates based on the BLKNET variable could be biased.

To avoid these pitfalls, I use village-level fragmentation variables to instrument for the fragmentation of the households' own network. Since villages are too large and dispersed for households to find and coordinate with each other, household preferences could not impact the fragmentation of entire villages. Thus, the variation in the degree to which villages were dispersed within the camp is orthogonal to a households' demand for child health except through its influence on the within-camp network fragmentation. I use the following system to estimate the impact of social network size on the health outcome:

$$BLKNET_{jk} = PERCVIL_{jk}*\gamma_1 + VILLPOP_{jk}*\gamma_2 + OLDNET_{jk}*\gamma_3 + X_{ijk}*\gamma_4 + CAMP_k*\gamma_5 + \varepsilon_{ijk} \quad (2a)$$

$$HAZ_{ijk} = \widehat{BLKNET}_{jk}*\delta + OLDNET_{jk}*\beta_1 + X_{ijk}*\beta_2 + CAMP_k*\lambda + \varepsilon_{ijk}. \quad (2b)$$

$PERCVIL_{jk}$ is the percentage of the village living in that child's block and $VILLPOP_{jk}$ is the village population within the camp. $\widehat{BLKNET}_{jk}$ is the instrumented BLKNET variable estimated in 2a.

To account for environmental differences, such as camp sanitation and access to medical facilities, and differences in mean block size, camp size and camp density, I include camp dummies ($CAMP_k$). The vector X_{ijk} may include the mean HAZ of children in the household who were at least 3 at the time of displacement, which is a proxy for household preferences for child health, or mothers' height, which controls for the child's genetic predisposition for height.

3.3 Data

Sample
The data used in this analysis were collected in fall of 2005 and winter of 2007 as part of the Uganda School Based Feeding Evaluation. All of the households in this sample were living in Internally Displaced Persons Camps in 2005. They were selected randomly among households with school-age children from a camp-level "revalidation" census conducted by World Food Programme in June 2005.[8] The sample used in this analysis includes children under 5 who were born at least 1 year after the household was displaced. Restricting the sample to children born one year after displacement ensures that the entire pregnancy occurred while the household was living in the camp surrounded by the exogenously disrupted social network. Since the health outcome, height-for-age z-score, is a cumulative effect of nutritional inputs from conception onward, limiting the sample to children conceived in the camp assures that nutritional inputs were not influenced by the pre-displacement network. By the 2007 data collection, some

[8] For details, see Adelman, Alderman, Gilligan and Lehrer 2008.

households had already moved out of the camp, particularly in Lira. Children born after the household left the camp were omitted from the sample.

The sample includes 207 children in 173 households from 23 IDP camps (Table 2).[9] The mean age of the sample is 21.6 months. The average household network size before displacement ($OLDNET_{jk}$) was 10.6. Nearly all network households went to the same camp (the average number of households was 9.3), though only a small number of households on average, 3.8, lived in the same block as the respondent households.

Thirty-seven percent of the sample is stunted (HAZ<2), which is considered a high-prevalence of stunting by NCHS/WHO standards. The mean HAZ is -1.4. These statistics suggest that the population of children under 5 born in these camps is chronically undernourished. Children from this region who were at least 3 by the time of displacement and therefore experienced their critical growth inputs before displacement also have a high propensity for stunting at 25 percent, which is considered a moderate prevalence. The mean HAZ of these children is -1.09, which is significantly less than zero. Since stunting represents a cumulative growth process, the prevalence typically increases with age. The finding that the prevalence of stunting is higher among younger children highlights the adverse conditions for growth in the camps. Overweight is not a concern in the analyzed sample with only 2 percent of children having weight-for-age z-scores greater than 2. Thus, this population has the potential to benefit significantly from improved nutrition.

Nearly 70 percent of children had a fever, cough or diarrhea in 30 days prior to measurement. Diarrhea in the past 30 days (42 percent) appears correlated with overall health status as HAZ is significantly lower (-1.6) among children who had diarrhea in the past 30 days than amongst those who have not (-1.6 vs. -1.2), though only at the 10 percent level. Fever and cough are not correlated with anthropometric outcomes. Morbidity is not correlated with pre-camp network size, though in-camp local network size is *negatively* correlated with having a cough in the past 30 days. However, when accounting for previous network size and camp effects, children in larger networks were *less* likely to have any of the illnesses listed above, suggesting that larger local networks do not increase the chances of contracting illnesses in this sample. Pre-camp network size is not correlated with current morbidity.

Household Survey Instrument
The household instrument used to collect details on social networks before and after displacement also included a household roster and questions on housing conditions, education, morbidity, immunizations and deworming, consumption, assets, employment, agriculture, credit, mother and child time use, and food aid and other aid receipt. The instrument also included questions about the household's displacement experiences, including timing of displacement, reasons for displacement, and village of origin.

Data to assess aspects of nutritional status were also collected for children ages 6-months to 17-years and on their mothers or primary female caregivers. The data included height or length (for children under 24-months) and weight. Data were collected by 7 nurses in the 2005 and 8 in 2007. All nurses went to each camp to limit biases that may arise from subtle variations in

[9] Thirty-eight children were measured in both rounds. In those cases, the 2007 measurement was omitted.

nurses' techniques. Additionally, all nurses participated in a 10-14 day training, which focused on standardizing data collection across patients and nurses. Height data were collected using height-boards; weight data were collected using solar scales. For children who were too young to stand on their own, the nurses calculated the weight by subtracting the mother's weight standing alone from her weight while holding the child. HAZ were calculated using WHO reference standards (WHO 2005).

For a subset of households, I also administered 1 of 2 additional questionnaires to collect details about their network interactions and about their displacement experiences. These instruments ask specific questions about the relationship to each member of the household's farmers' group and about new (or altered) networks that households maintain in the camp.

Administrative Data

Instruments were created from World Food Programme and camp administrative data on the number of households in each block from a given village. Household data were linked to administrative data by camp and village of origin. In all but two camps in Pader, WFP provided 2006 camp census data by block, which also included the village of origin. In Puranga camp, the WFP data were incomplete, and therefore I used 2005 camp administrative records to calculate the instruments. In Kalongo camp, WFP data were complete, but "blocks" did not correspond to geographic areas, so the data did not provide a measure of geographic dispersion. However, the camp itself kept census records based on different administrative units, which did have geographic designations. I used the 2005 census data for that camp in my calculations.[10]

Between the 2005 and 2006 censuses, some camps in Pader began to splinter into "satellite" camps – smaller camps that were closer to households' farmland that provided security, but allowed households access to land for production. Since the 2005 census data did not include village of origin, I were forced to use the 2006 census data even though some households had already moved to satellite camps before the census occurred. To account for the loss, I linked satellite camp census data, which included the village of origin, back to the 2005 census data, which included the in-camp block of residence, by household member names.

In Lira, WFP did not retain census records, so data to construct instruments came exclusively from camp records. In 3 camps, home of origin data were kept at the parish level rather than the village level. The parish is the next largest administrative unit above the village. Where only parish-level data were collected, I used relative size of the village within the parish and likelihood of the village to go to the camp in question to estimate the village representation in the camp and block.

3.4 Instruments

To instrument for the in-camp social network size, I use the percentage of the village living in the child's block and the size of the village represented in the camp. Table 4 presents coefficients

[10] These data were the major constraint on sample size for this analysis. The Uganda School Based Feeding Evaluation included 7 camps for which I was unable to obtain sufficient administrative data to construct instruments. The lack of administrative data was more severe in Lira because WFP-Lira did not retain census records and because many camp-held records were lost as camp administrators moved home during resettlement.

of a regression of the network size measure ($BLKNET_{jk}$) on the two instruments (column 1) for all sampled households in the sampled camps. Both coefficients on the instruments are significant in the regression of the in-camp network size, though the coefficient on the village population in the camp is significant only at the 10-percent level. These results suggest that the instruments meet the IV criterion of correlation with the variable of interest.

Columns 2 and 3 suggest that the instruments also meet the exogeneity criterion. Neither the regression of whether or not the household was part of a farmers' group before displacement nor that of the pre-displacement network size on the instruments yields estimates that are significantly different from zero. Thus, households with larger networks were not more likely to be in more or less fragmented villages, suggesting that variation in the instruments is orthogonal to a household's ability or interest in forming or maintaining a social network. These results support the anecdotal evidence presented above that village-level fragmentation was random to the household.

The first stage regression of network size on the instruments and other exogenous variables is presented in Table 5. In all three specifications, the instruments are significant at the 1 percent level. The F-statistics of the joint significance of the instruments are around 8 for all specifications. The exogenous variables included in the second stage are the pre-displacement network size (OLDNET), the mean HAZ for siblings who were 3 or older when the household was displaced, and the height of the mother. Camp fixed effects are included in all regressions. Standard errors are clustered at the household level.

4. Do Local Networks Increase Heath and Nutrition Investments in Young Children?

4.1.1 Basic Results

Local social networks can affect HAZ by increasing the resources available for or directed to child health and nutrition inputs. I estimate a reduced-form model of HAZ on instrumented local network size, controlling for pre-displacement network size, mother's height, and the height of siblings who had past critical growth periods at the time of displacement. Table 6 shows that increasing the local network size by one household leads to between a .10 and .27 z-score improvement in HAZ, showing that the presence of an additional network member substantially increases household investments in the health and nutrition of the youngest children.

All specifications in Table 6 include a control for the original network size (see discussion above) and camp dummies. The main model includes additional controls for mother's height and mean HAZ for older siblings. Mother's height controls for the child's genetic predisposition for height. The average HAZ of siblings who were at least 3 at the time of displacement may control for household preferences in addition to genetic endowment. Since HAZ at age three is highly predictive of HAZ later in life (when the measurement was taken), this control gives an indication of nutritional inputs for children in the household before displacement, and hence, controls for household health input demand prior to network disruption.

Columns 1 and 2 provide the OLS and IV estimates of the main model, including all controls. The OLS estimate in column 1 shows a .1 HAZ improvement from having an additional network member in the block, conditioned on the original network size. The IV estimate is nearly 3 times larger, showing a .27 z-score improvement from an additional local network household. Without the additional controls, the IV estimates are slightly lower. Column 3 shows a .18 z-score improvement from an additional household in the local network, controlling only for the original network size. The model in Column 4 which also includes a control for mother's height detects a .21 z-score improvement from an additional household in the local network. The differences between the OLS and IV estimates likely arise from measurement error in the BLKNET variable, attenuating the estimated effect of the local network.

While original network members who were not part of the in-camp local network maintained contact with the sample households (77.6 percent of households in the original network that were not part of the local network had weekly contact with the sample household), the original network size had no detectable impact on the health outcome in any specification. This finding shows that that the household attributes determining pre-displacement network size do not effect in-camp human capital investments, and underscores the importance of the local network, rather than a more extended network, on child health and nutrition investment. The other controls have the expected signs in all specifications.

4.1.2 Interpretation of main results

Regardless of where on the distribution the child's z-score lies, a change in z-scores is equivalent to the same change in height, given the child's age and gender. For example, the estimated impact of an additional network household from the main specification (column 2) is roughly equivalent to .84 cm for a 2-year-old male or 1 cm of growth for a 3-year-old male, or about .95 to 1.1 percent of the median height for a boy of the respective age.

4.2 Results for sub-groups

In Table 2, I presented evidence that the instruments were correlated with the in-camp local network size (BLKNET), but not with household preferences for network size: neither participation in a farmers' group nor the size of the pre-displacement group are correlated with village-level disruptions. While it appears that the process generating network disruption is orthogonal to household preferences for network size, it may still be possible that the processes leading to the level of network disruption may also contribute to the household's *ability* to produce healthy children.

In focus groups, respondents often said that children coming from areas near the camp fared better because their parents could access land to grow food. Table 7 shows that there is no detectable relationship between distance from the camp to the home and percentage of the village living in the respondent's block, providing evidence that distance does not systematically affect village disruption. However, the size of the in-camp village population decreases in distance from the camp, likely because the choice of camps was less clear to households not living very close to a given camp. Column 3 shows that there is no correlation between HAZ and the household's distance from home. Similarly, HAZ is not affected by the number of visits that the child's household made in the past 6 months, suggesting that distance from the camp neither fully explains within-camp village disruption nor the anthropometric outcome.[11] Nonetheless, table 8 shows 3 different approaches to control for distance in the estimation of the equations 2a and 2b. In column 1, a distance control, which is not significant, is included. The estimate of the coefficient on BLKNET is unchanged. In columns 2 and 3, I limit the sample to only children coming from at least 1 and at least 2 kilometers from the camp. Again, the coefficients are virtually unchanged, indicating that distance does not simultaneously determine the instruments and outcome.

World Food Programme and other NGO staff were also concerned about the health outcomes of children in "vulnerable households," such as female-headed households or households with elderly heads. Some respondents also reported that these households were more likely to be isolated in the camp.[12] Very few children in this sample come from these more vulnerable households, so these households do not likely drive the results. Moreover, being a female-headed household, an elderly headed household or a household with an elderly mother does not predict either instrument. Table 9 shows the estimates of the main model omitting the vulnerable households. Point estimates of the coefficient on BLKNET do not vary significantly from that of the main model.

Finally, I was concerned about the possibility that households who do not put much effort into child care for unobservable reasons may also be ostracized by their original networks or even villages when arriving in the camp. These households would therefore appear to have a highly disrupted network and have poorer health outcomes, though the disruption would not have driven these outcomes. Since the factors leading to this problem are unobservable, I tried to identify potentially "shunned" households as those from highly concentrated villages living in a block with very few villages mates. Column 6 of Table 7 shows the estimates omitting children from households with a high village concentration (village's Herfindahl's index is greater than camp median Herfindahl's index) but who live in blocks with very few village mates (percentage of village in block (PERCVIL) is less than camp median). While the coefficient is not significant at conventional levels when clustering at the household level, the magnitude is consistent with the main results.

5. Human Capital Investment made before Displacement

The local social network size used in this paper was determined after households were displaced. Therefore, if the disruption was truly orthogonal to household human capital investment preferences, then the model should not pick up an effect of in-camp social network size on human capital investments made before displacement. Mother's height, for example, should not change (much) after adolescence, so the height of people who had reached adulthood before displacement should not be affected by the in-camp local network size. Likewise, educational

[11] I estimated a regression of HAZ on the number of visits home in the past 6months and the camp dummies. The coefficient on visits home (-.0024) was not significantly different from zero (se=.616).

[12] Female-headed households may include widows and divorcees who cannot rely on former inlaws for support. Elderly head of household may have had more difficulty in moving to the camp and therefore be particularly unable to coordinate with network members. On the other hand, other households may have actively tried to live near elders in the camps, leading to a less disrupted in-camp network.

attainment for those who completed their education before displacement should not be affected by the in-camp network size.

Table 10 shows that the in-camp local social network size has no effect on mothers' height or mothers' educational attainment, which is expected as these outcomes were determined before displacement. These results suggest that mothers with greater human capital were not more or less likely to be in disrupted networks or villages and that human capital preferences were not systematically correlated with the household displacement experiences or network disruptions

6. Conclusion

In northern Ugandan villages, members of social networks, and particularly farmers' groups, take responsibility in raising each others' children. However, since households choose their networks, it is difficult to determine whether networks influence households' choices or whether households with similar preferences choose similar types of networks. This study presents a rare opportunity to identify a causal relationship between social network size and household investment behavior. The war in northern Uganda disrupted all aspects of families' lives, including the networks that households relied on for child rearing in the villages, in ways that the household could not foresee or influence. As such, the household's in-camp network characteristics were mostly exogenous to household preferences, presenting an opportunity to explore how some network characteristics influence household behaviors.

This study shows that small changes in households' network size yield substantial improvements in HAZ for preschool-age children, demonstrating the role of networks in increasing health and nutrition investments. Larger networks may expand resources available to households for investments or may ensure that a larger proportion of these investments are directed to children whose future welfare depends on these time-sensitive investments. Investments in early childhood nutrition lead to increased educational attainment, improved cognitive functioning, better adult health outcomes and higher productivity and wages (for example, Behrman et al., 2003; Grantham-McGregor, Fernald, and Sethuraman 1999; Haddad and Bouis, 1991; Martorell 1997; Quisumbing and Yohannes, 2005; Schultz, 2002; Thomas and Strauss, 1997, among others). In developing countries, where food resources are scarce, social networks can play a critical role in ensuring that nutritional investments are made so that households can realize these substantial future benefits. In northern Ugandan IDP camps, the stakes are particularly high as the opportunities for human capital development are limited for all age groups. Improved early childhood nutrition could be critical to lasting economic recovery as households rebuild their lives.

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Appendix 1: Tables

Table 1: Camp Demographics

	Camp Population	Number of Households*	Number of Blocks	Average number of Households per Block*	Number of Villages (with more than 5 households)
Pader Camps					
Laguti	3645	963	5	193	21
Omot	4863	884	7	126	31
Geregere	5984	1719	10	172	21
Wol	6344	1619	5	324	47
Arum	7784	1798	11	163	25
Amyel	9251	2097	15	140	32
Corner Kilak	11019	2713	10	271	33
Puranga	13159	3058	17	180	70
Adilang	14894	2788	18	155	47
Lira Palwo	18402	3850	18	214	59
Pajule	18651	4260	16	266	91
Atanga	20493	5019	6	837	18
Kalongo	38737	7598	n/a	n/a	d/k
Patongo	40704	9370	69	136	165
District mean	**15281**	**3410**	**16**	**244**	**51**
Lira Camps					
Aliwang	4873	1104	9	123	54
Abia	10645	2411	15	161	21
Okwang	12559	2845	18	158	55
Orum	15780	3574	9	397	104
Abako	20150	4564	27	169	46
Alebtong	24760	5608	22	255	23
Ogur	27061	6129	20	306	59
Apala	36767	8328	38	219	d/k
Agweng	40072	9076	34	267	103
District mean	**21407**	**4849**	**21**	**228**	**58**

Table 2: Housing Conditions and Access to Health Care

	Mean	Standard Error
Water Sources		
Borehole	85.69	4.00
Protected Well	10.44	3.69
Housing structures		
Floor		
Earth/dung floor	98.06	0.77
Walls		
Unburnt brick walls	78.92	2.60
Mud and Wottle walls	16.83	2.12
Roof		
Thatched Roof	94.39	1.23
Knows of the following health facility in camp		
Community Health Resource Person	93.97	1.62
Drug Shop/Pharmacy	92.22	2.11
Health Center/Clinic	94.16	1.33
Traditional Healer	75.49	3.11
Traditional Birth Attendant/Midwife	98.83	0.40
Knows a hospital to access in emergency	98.45	0.58

Table 3: Descriptive Statistics

	Mean	Standard Error
Child Characteristics		
Age (months)	21.55	(.851)
HAZ	-1.37	(.113)
Morbidity (Prevalence in past 30 days)	69.7%	(3.27)
Fever	54%	(3.54)
Cough	33%	(3.35)
Diarrhea	42%	(3.52)
Household Characteristics		
Household Size	7.68	(.127)
Number 6-13 Year-Olds in Household	2.55	(.088)
Number 0-5 Year-Olds in Household	2.19	(.060)
Head of Household Male	0.81	(.028)
Mother's Height	162.0	(.393)
Mother's Highest Grade Completed	2.6	(.227)
Mean HAZ of siblings	-1.09	(.056)
Network Characteristics		
Size of Predisplacement Network	10.64	(.383)
Size of Predisplacement Network in Camp	9.28	(.396)
Size of Predisplacement Network in Block	3.79	(.238)
Instruments		
Percentage of Village Living in Block	21.8	(1.6)
Village Population within Camp	120.1	(6.935)

Observations	207

Table 4: Instrument Validity
Regression of In-Camp Network Size and Pre-Displacement Network Size on Instruments

	In-Camp Network Size ($BLKNET_{jk}$) (1)	**Belonged to Farmers' Group before Displacement** (2)	**Pre-Displacement Network Size ($OLDNET_{jk}$)** (3)
% Village in Block	4.621***	-0.0601	-0.314
	[0.93]	[0.100]	[1.67]
Village population in Camp	0.00322*	0.0000574	0.00159
	[0.0019]	[0.00022]	[0.0034]
Constant	3.103***	0.694***	11.04***
	[0.81]	[0.086]	[1.45]
Observations	377	482	373

Standard Errors in Brackets
Camp-dummies included in all regressions

Table 5: First Stage Regression of In-Camp Network Size on Instruments and Exogenous Variables

	In-Camp Network Size ($BLKNET_{jk}$) (1)	**In-Camp Network Size ($BLKNET_{jk}$)** (2)	**In-Camp Network Size ($BLKNET_{jk}$)** (3)
% Village in Block	6.191***	5.823***	6.133***
	[1.88]	[1.70]	[1.86]
Village population in Camp	0.00747***	0.00712***	0.00729***
	[0.0027]	[0.0027]	[0.0027]
OLDNET	0.270***	0.269***	0.270***
	[0.077]	[0.075]	[0.077]
HAZ of Siblings Born Before Displacement		-0.383	
		[0.49]	
Mother's Height		-0.0198	-0.0267
		[0.036]	[0.037]
Constant	-2.927*	0.0290	1.430
	[1.60]	[5.93]	[5.83]
F-Stat of Instruments	7.61	8.12	7.61
Observations	207	207	207

Clustered Standard Errors in Brackets
Camp-dummies included in all regressions

Table 6: OLS and IV Estimates of the Impact of In-Camp Network Size on HAZ

	OLS	**IV 1**	**IV 2**	**IV 3**
Dependent Variable	**HAZ**	**HAZ**	**HAZ**	**HAZ**
	(1)	**(2)**	**(3)**	**(4)**
$BLKNET_{jk}$	0.0982**	0.267**	0.179*	0.209**
	[0.040]	[0.11]	[0.10]	[0.10]
OLDNET	-0.00874	-0.0538	-0.0300	-0.0391
	[0.029]	[0.041]	[0.036]	[0.037]
HAZ of Siblings Born	0.405**	0.517***		
Before Displacement	[0.19]	[0.20]		
Mother's Height	0.0484**	0.0545**		0.0622***
	[0.022]	[0.022]		[0.021]
Constant	-9.309***	-10.14***	-1.879***	-11.90***
	[3.50]	[3.40]	[0.59]	[3.32]
Observations	207	207	207	207

Clustered Standard Errors in Brackets
Camp-dummies included in all regressions

Table 7: Correlations of Distance from Home to Camp with Instruments

	% Village in Block	**Village's Camp Population**	**HAZ**
	(1)	(2)	(3)
Distance from	0.00119	-3.668***	.0241
Home to Camp	[0.0028]	[1.19]	[.031]
Constant	0.0987**	144.5***	-1.836***
	[0.045]	[19.1]	[.53597]
Observations	381	391	(207)

Camp-dummies included in all regressions

Table 8: IV Estimates of the Impact of In-Camp Network Size on HAZ; Controlling for Distance from Village of Origin to Camp

	Full Sample	**Children from villages at least 1 km from camp**	**Children from villages at least 2 kms from camp**
Dependent Variable	HAZ	HAZ	HAZ
	(1)	(2)	(3)
$BLKNET_{jk}$	0.266**	0.302***	0.225**
	[0.11]	[0.11]	[0.10]
OLDNET	-0.0511	-0.0611	-0.0530
	[0.040]	[0.041]	[0.039]
HAZ of Siblings Born	0.531***	0.581***	0.552***
Before Displacement	[0.20]	[0.20]	[0.19]
Mother's Height	0.0561***	0.0568**	0.0588**
	[0.022]	[0.022]	[0.024]
Distance from Home to	-0.0198		
Camp	[0.028]		
Constant	-10.32***	-10.46***	-10.84***
	[3.40]	[3.50]	[3.68]
Observations	207	198	168

Clustered Standard Errors in Brackets

Camp-dummies included in all regressions

Table 9: IV Estimates of the Impact of In-Camp Network Size on HAZ; Controlling for Potentially Marginalized Households

	Omitting Female-Headed HH	**Omitting Elderly HOH**	**Omitting Older Mothers**	**Omitting Maternal Orphans**	**Omitting Double Orphans**	**Omitting potentially shunned HHs**
Dependent Variable:	HAZ	HAZ	HAZ	HAZ	HAZ	HAZ
	(1)	(2)	(3)	(4)	(5)	(6)
$BLKNET_{jk}$	0.287***	0.329**	0.272**	0.264**	0.238*	0.228
	[0.11]	[0.14]	[0.11]	[0.11]	[0.13]	[0.14]
OLDNET	-0.056	-0.0584	-0.043	-0.0479	-0.05	-0.0385
	[0.036]	[0.036]	[0.037]	[0.040]	[0.042]	[0.060]
HAZ of Siblings Born	0.537**	0.471**	0.374*	0.480**	0.516**	0.504*
Before Displacement	[0.22]	[0.19]	[0.19]	[0.21]	[0.23]	[0.26]
Mother's Height	0.0587**	0.0593**	0.0555**	0.056***	0.0495**	0.0260
	[0.026]	[0.024]	[0.022]	[0.022]	[0.023]	[0.033]
Constant	-10.84***	-11.09***	-10.87***	-10.54***	-9.292**	-5.572
	[4.09]	[3.85]	[3.60]	[3.38]	[3.62]	[5.28]
Observations	167	187	164	196	184	140

Clustered Standard Errors in Brackets
Camp-dummies included in all regressions

Table 10: OLS and IV Estimates of the Impact of In-Camp Network Size on Pre-Camp Outcomes

	IV 1	**IV 2**	**IV 3**
Dependent Variable:	Mother’s height	Mother’s Class	Size of Household at Arrival
$BLKNET_{jk}$	-0.0406	-0.117	0.119
	[0.30]	[0.15]	[0.092]
OLDNET	-0.0484	0.0724*	-0.0520**
	[0.090]	[0.039]	[0.024]
Age	-0.00112	-0.0904***	
	[0.029]	[0.012]	
Constant	160.1***	5.709***	5.006***
	[2.54]	[0.81]	[0.40]
Observations	331	379	207

Clustered Standard Errors in Brackets
Camp-dummies included in all regressions