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Abstract

Currently, there are over 42 million people around the world that have been forcibly displaced from their homes. Researchers have posited that this movement has severely impacted the affected populations, but due to estimation and data difficulties, little is known about the causal impact of this movement on livelihoods. This paper presents credibly causal evidence of the effect of displacement. A panel data set on households and communities near a conflict zone in northern Uganda offers the opportunity to exploit a geographic discontinuity design in order to minimize endogenous determinants of displacement and estimate the immediate and postdisplacement impact of displacement on civilians. I find that displaced households experience an initial decrease in consumption of between 28% and 35%, as well as a 1/2 standard deviation decrease in the value of assets compared to nondisplaced households. Two years after households returned home, displaced households still lag behind nondisplaced households with 20% lower consumption, and a 1/5 standard deviation less assets. However, as predicted by a heterogeneous neoclassical growth model, displaced households in the top three quartiles of predisplacement assets appear to have recovered a portion of their consumption, though with significantly reduced education and wealth levels. There is no recovery for the bottom quartile households, who appear to be trapped in a lower equilibrium.

JEL classification: O15, O20, O55

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1 Introduction

The UN estimates that over 42 million people around the world have been forcibly moved from their homes into refugee and internally displaced person (IDP) camps (UNHCR (2011)). Unlike other forms of migration, where the choice of movement can be an optimization problem for the household, the majority of displaced people are forced to leave their homes and land with little more than what they can carry. Such movement constitutes a large economic shock to many households. The ability and speed of people to recover from such a shock has implications for both individual well-being and national long-term growth.

Displacement is commonly caused by weather shocks and conflict, with the latter being the most studied. In his early empirical study of the macroeconomic cost of civil wars, Collier (1999) finds that restoring peace to a war-torn area does not necessarily lead to complete economic recovery. Since this early work, a debate has emerged about the long-term negative consequences of armed conflicts. A number of studies have found that civil war has little or no lasting effect on an area (David and Weinstein (2002), Brakman et al. (2004), Miguel and Roland (2011) and Chen et al. (2008)). In fact, conflict shocks can instead have net positive impacts, such as increased political participation (Bellows and Miguel (2009) and Blattman and Annan (2010)).

However, there is also evidence of long-run negative impacts from conflict. Blattman and Annan (2010) and Shemyakina (2011) find that conflict and military conscription have a negative effect on years of schooling. Kondylis (2008) exploits geographic differences in the timing of return from Rwandan refugees to identify the impact of displacement on agriculture production finding that those who returned to their land are better off economically than those who remain displaced¹.

A number of papers have attempted to estimate the effects of forced displacement. Recent examples include Cortes (2004), who compares refugees to economic immigrants, Ibanez and Moya (2006), who make a simple comparison of asset loss and consumption changes between displaced and nondisplaced Columbians, as well as Ssewanyana et al. (2007), who attempt to

¹ See also evidence on the negative impacts of conflict from Collier et al. (2003), de Walque (2006), Bundervoet et al. (2009), Behrman (1988), Alderman et al. (2006), Akresh and de Walque (2008), Barrett and Carter (2006), Jalan and Ravallion (2001), and Lokshin and Ravallion (2004).

estimate the effect of displacement on consumption levels in northern Uganda. Porter and Haslam (2005) conduct a meta-analysis of a large number of studies on the effect of displacement on mental health. However, these studies fail to confront the difficult identification problems through providing credible counterfactuals. Other studies, such as Werker (2007) and Boothby (2006), have thus focused on a description of the current conditions and avoid a discussion of the causal impact of displacement.

The theoretical impact of displacement could go in a number of directions, and may not affect all households the same way. In a neoclassical growth model (presented in greater detail later) a one-time shock to capital will not affect equilibrium income or growth. This is due to a change in investment in physical and human capital in response to the shock that allows households to return to their long-run growth rate. If households lack access to human and physical capital accumulation, displacement may instead lead to a poverty trap. An initial shock to household assets, such as is often experienced during displacement, may force the household into a lower equilibrium than those who did not experience the shock².

This paper uses a panel dataset of displaced and nondisplaced individuals in Uganda to test the short-term and post displacement impacts of displacement on households. Common to many conflicts in developing countries, a rebel group used the cover of difficult terrain to wage a guerrilla war against the government, with civilians often caught in the middle. Also common to many displacement situations around the world, the majority of the population in northern Uganda was forced into semipermanent IDP camps in 2002 due to this fighting. At the time of the first survey in 2004, 1.6 million people were displaced. After a peace agreement was signed in 2006, people began to return home. A second survey of the 2004 households was conducted in 2008, once communities in the sample area studied here had returned home for 2 years.

In order to reduce unobserved selection and biases that may be present in the decision to displace I use a geographic boundary discontinuity design (BDD), as discussed by Lee and Lemieux (2010), to compare neighboring communities in the Lira district, which lay to the south of the main conflict areas. Displacement in Lira was instigated by local authorities in consultation with the military and created a division where levels of income and conflict were similar on either side of the division. All households in the northeast of Lira were displaced,

² Ghobarah et al. (2003) give an overview of these effects. Some micro studies that find poverty traps after conflict have ended include de Walque (2006) in Cambodia; Bundervoet et al. (2009) in Burundi; Alderman et al. (2006) in Zimbabwe; and Akresh and de Walque (2008) for Rwanda. Justino (2009) reviews theories.

while all households in the southwest were not displaced. In order for the identification strategy to hold, we must believe that boundaries were developed “randomly”, i.e. households had no power over which side of the line they ended up on and those that made the boundaries did so arbitrarily. I argue that the division in Lira was heavily influenced by distance from main rebel bases and supply lines. The line of displacement thus ended in a haphazard way that produced a random shock to households. Following the standard usage of the BDD method, I only include households in the analysis that were close to the division line, thus reducing selection effects and unobserved biases³.

I employ a number of robustness checks for the results, as well as a range of controls, including polynomial values, in weighted and unweighted regressions. In order to better control for levels of violence, I truncate the sample by only including communities closer to the division of displacement and conduct placebo tests with different samples and neighboring districts to determine if the displaced communities are somehow unique. I also present evidence that the results are not driven by remittances and that while displacement takes place in a war zone, conflict is not likely driving the main results. To minimize the effect of attrition from the panel data collection, which was low at 15% but biased toward formerly displaced people, I conduct a bounding exercise. The results do not change dramatically, even under heavy assumptions.

The results are robust and suggest that the initial impact of displacement was quite large. In 2004, while still in IDP camps, displaced households experienced an initial decrease in consumption of between 28% and 35%, as well as a 1/2 standard deviation decrease in the value of assets compared to nondisplaced households.

Results from 2008, two years after households returned home, suggest that households have partially recovered from these initial effects of displacement, but still lag behind nondisplaced households. Households that faced displacement had 20% lower consumption, and a 1/5 standard deviation fewer assets. For the full sample, there is no evidence of changes in years of education of household members and consumption of protein.

However, displacement did not impact all individuals equally. I make use of retrospective questions to determine household assets before displacement in order to separate the effect of

³ Discontinuities in geography have been used extensively in education studies, most notably in Black (1999) and Bayer et al. (2007) who look at school attendance boundaries on student outcomes, and Lavy (2006) who looks at effects of busing using adjacent neighborhoods. Pence (2006) and Lalive (2008) have also used the design to identify mortgage and employment laws, respectively, using adjacent states.

displacement on very poor households from the general population. I look at those who reported assets in the bottom quartile versus those in the top three quartiles. The effects of displacement differ across these retrospective groupings: those in the bottom quartile of assets previous to displacement actually lost consumption upon returning home, perhaps due to the loss of free food provision by the World Food Program (WFP), while asset loss was very small, likely due to the low number of assets to begin with. Those in the top quartiles lost a large number of assets and have about one less year of education. However, the top quartiles have experienced a significant recovery of consumption. The results are consistent with a neoclassical growth model in which those with low investment opportunities are trapped in a lower equilibrium.

The remainder of this paper is organized as follows. The next section presents some history of the conflict. Section 3 discusses the theoretical implications of the impact of displacement shocks and the main questions tested. I present the data in section 4. The identification strategy employed is discussed in detail in section 5, and section 6 lays out the econometric model. Section 7 presents the initial and postdisplacement results of displacement along with heterogeneity analysis. In section 8 I discuss a number of robustness and placebo tests, while section 9 concludes.

2 History of the Conflict and Timeline

In 1986, the now current president of Uganda, Yoweri Museveni, overthrew the government with the support of ethnic southern Ugandans. The Acholi people of the north composed the main parts of the military in previous governments, and the new government made many Acholis nervous about reprisals. Joseph Kony eventually formed a military-styled cult called the Lord's Resistance Army (LRA). Kony took advantage of the cover of the bush and used surprise attacks against enemies in the Acholi region to acquire provisions, arms and people--especially youth. Soldiers used many of the abducted youth as fighters and sex slaves, forcing these children to participate in violence against Acholi civilians and government soldiers. According to estimates, Kony supporters also forced approximately 28% of the males abducted to murder a civilian; they forced 8% to murder a family member. Even among those who were never abducted, violence was high. 37% of all youth males witnessed a killing (Blattman and Annan (2010)). Abductions proved to be an effective tool for terrorizing the local population and replenishing the group numbers (Beber and Blattman (2011)).

In 1993, some of the more wealthy of the civilian population voluntarily moved to towns to avoid the conflict, but most people were either unable or unwilling to leave the rural areas. In order to isolate fighters from the general population, the government ordered all of the Acholi people to move into camps in 2002 – forcing people from their villages overnight. The conflict eventually spilled over into neighboring communities in the Lira district. In early 2003, seeking to flee the violence, many Lira communities near the Acholi region sought refuge in trading centers that also eventually became IDP camps. Figure 1 presents a map of the areas in question. Living conditions were very tight with tens of thousands of people confined to a small area where they had no access to agricultural land.

The movement into IDP camps by people in Lira was on the surface different from the Acholi experience, yet very similar to others displaced around the world. Displacement was decided on by local government and military officials based on fears of LRA attacks, which were themselves based upon supply lines. There were two other safe areas people could move to; the more developed south, where people would have faced high travel costs and integration issues with a different ethnic group; or the large town in Lira. Both of these options were beyond the means of the majority.

Those who fled also had more time to gather assets to carry. The Acholi camps developed overnight, while the Lira camps took a few months to formalize. In this time, people were able to pack and organize their household assets. Nonetheless, space in the camp was limited, as was the number of goods people could bring. Homes and land had to be abandoned, along with larger animals and non-essential household items, including farming equipment and furniture.

Prior to the displacement, the majority of households earned income from agriculture and livestock. Much of this was subsistence based, but some was traded in centers within and between subcounties. While in the camps, people did not have safe access to their land; thus they either relied on food handouts or on whatever skills they possessed before entering the camps. Initially, the camps had poor access to water and had no sanitation, education, or healthcare facilities. Over time, local and international NGOs assisted in the building of much of the infrastructure available in the camps, though conditions remained difficult throughout the entire period of displacement.

The LRA eventually signed a peace deal and left Uganda for the Congo in late 2006. However, most people in Acholiland were fearful of the LRA returning and so did not return home until 2009. People in Lira, who had always been farther from the center of conflict than the

Acholi, began returning in early 2007. The decision to return was based on both the poor conditions of the camps and the desire of people to return to their previous lives.

Those in Lira share similar experiences with other displaced populations, namely a lack of access to land, the creation of an idle population, and a population increasingly reliant on international organizations for public services like water, sanitation, schools, and hospitals.

3 Impact of Displacement Shocks: Some Theoretical Implications

The consumption of a household is based on the production of its members. Shocks, such as forced displacement, can interrupt this production by damaging or destroying important inputs. In an agricultural- and agrarian-skills-based economy like northern Uganda, production is closely tied to productive agricultural assets and the ability of individuals to utilize them efficiently. Physical capital, such as farming tools and storage facilities, are important for an agriculture-based society. As will be shown in Section 7, displacement led to a significant loss in these assets. Likewise, a loss to human capital has serious impacts for such populations. In this section, I develop a neoclassical model of the impact of displacement on households where a shock to assets can have a differential impact on a household, depending on how well a household is able to invest in physical and human capital. In this model, a shock can then lead to either recovery, or a poverty trap. For instance, if households need a minimum asset base or access to markets in order to save and accumulate assets (Barrett and Carter (2006), Jalan and Ravallion (2001) and Lokshin and Ravallion (2004)), a shock that leads to a loss of assets or access could make it difficult for people to return to their original equilibrium. Shocks can also lead to a lack of access to capital (Mogues and Carter (2005)) or the inability to use skills (Ibanez and Moya (2006)), such as when households move to low-risk, low-return businesses after a conflict. While protecting these households against severe destitution, this strategy hinders their ability to accumulate useful assets⁴. The contribution of this section is to explore how the neoclassical growth model can produce two different outcomes from a shock based on the level of investment capacity, i.e. wealth, of the household.

In a neoclassical framework, such as discussed by Barro and i-Martin (2003), an economy is composed of one sector of production and two inputs: human and physical capital. Let

⁴ A more detailed discussion of the labor market impacts of conflict can be found in Ibanez and Moya (2006), who examine the difficulty of using skills after a destruction of networks and of integrating into new environments.

consumption of the household, Y , be determined through a Cobb-Douglas production function with constant returns to physical (K) and human (H) capital:

$$Y = AK^\alpha H^{(1-\alpha)} \quad (1)$$

where A is the total factor productivity of a household and $\alpha \in [0,1]$. Let the two capital stocks depreciate at a rate of δ and be restocked through investment. Investment in physical and human capital, I_K and I_H , thus produces a resource constraint for the household.

If the net marginal products of physical and human capital are equal, the steady-state ratio of the two capital stocks is:

$$K/H = \alpha/(1-\alpha) \quad (2)$$

This is a steady-state condition. If the ratio of K/H deviates from this value through an exogenous shock, households will make changes to the capital stocks to return to this value. As physical and human capital are not interchangeable, this investment change will happen through a decrease in investment of one capital stock and an increase in another.

War is an obvious shock that can change K/H . For instance, in the case of a war that destroys large quantities of physical assets but leaves human capital unchanged, H is more abundant than K and $K/H < \alpha/(1-\alpha)$. Households will then decrease investment in human capital and focus more on re-acquiring physical capital. The “imbalance effect” occurs when production growth increases after the K/H ratio deviates from the steady-state value. Thus, a one-time shock to capital does not affect equilibrium income or growth.

If households differ in their ability to invest in human and physical capital, the long-run effect of a shock may not be equal across all households. Wealthier households with access to investment options may be able to invest in productive assets and could potentially return to the steady-state in Equation 2. Poorer households with fewer investment options may become trapped in a lower K/H ratio. Over time, this could become a new, lower, steady-state.

This possibility of persistent effects from shocks is common in the poverty trap and endogenous growth literature. For instance, the poverty trap literature suggests that people could become trapped in a lower steady-state if the shock places them in a position where they are unable to “catch-up” to those who were not affected by the shock. Justino (2009) argues that

recovering from asset loss can be difficult if households move to low risk/low return activities after conflict. While doing so could protect households against severe destitution, low return activities hinder the individual's ability to accumulate useful assets.

This model produces competing predictions for the postdisplacement impacts of displacement that can be tested in the northern Uganda context. As people moved to the IDP camps, they were unable to keep all of their physical assets. The displacement thus produced an imbalance of productive capital. In the model presented above, if households that were not displaced were at a steady-state level of production, households that lost physical assets would have to reinvest in them while decreasing human capital investment. If households are not able to make this investment – that is, they have too little wealth – they will be trapped at a lower steady-state level of production.

4 Data

The data used in this study is a panel data collection from the Northern Uganda Survey (NUS), which was collected by the Uganda Bureau of Statistics (UBoS) in late 2004 and late 2008 for use in a development program funded in part by the World Bank. The survey covered all 18 districts in the northern and eastern regions of Uganda. Data collection in 2004 was done while households had resided in IDP camps for approximately 2 years. The data collection in 2008 was done after households had returned to their original communities for approximately 2 years.

In 2004, UBoS interviewed households in northern Uganda using a two-stage cluster design. In the first stage, interviewers obtained a list of subcounties and selected one community or IDP camp randomly from within the subcounty. In the second stage, UBoS visited each community selected, determined the size of the community, and randomly chose ten households to interview. The data used here reflects the 22 rural communities interviewed in Lira district, encompassing 220 households.

These interviews were conducted with the head of the household, who was asked detailed questions about the household as a whole as well as all individual members of the household. Among the data collected was information on the sex, age, health and education of every person in the household; the number of adults and children; the displacement status (whether an IDP or not) of the household; and the assets of the household, which included animals, household

utensils, electronics, land, and vehicles. Information on the number of each of these assets was collected from the respondents for both 2004 and retrospectively for 1999.

In 2008, UBoS conducted a follow-up survey on the same households, using the same set of questions. Households were tracked to the original location of the 2004 survey and, if not found, were tracked in neighboring communities. In the sample used here, the attrition rate of households was relatively low at 15.3%. Table 1 presents the results of a Logit regression on the likelihood of a household in the 2004 survey being found for the 2008 data collection. The only significant variable is displacement status in 2004: 88% of the 34 households not found were IDPs, versus 59% of the 186 found. To account for potential biases from attrition, the following analysis includes weights for predictors of attrition and nonweighted results for comparison. A bounding exercise is also employed to test how important this attrition could be for the main results.

I construct an index of household assets using principal components analysis (PCA). PCA extracts a linear combination of assets that best express the common information. Each variable is first normalized by its mean and standard deviation, and then, for the first principal component, a linear combination of all of the variables is found that maximizes the variance. This procedure produces an index of assets with zero mean that is very robust to the specification of the assets included (Lindeman et al. (1980) and Filmer and Pritchett (2001)). I include the household per capita number of the following assets: bicycles, cattle, chickens, pigs, hoes, televisions, radios, phones, furniture, vehicles, buildings, ploughs, and land (in acres).

The summary statistics for rural residents in Lira are presented in table 2. 64% and 59% of the households resided in an IDP camp in 2004 in the full and border samples, respectively. In 2004, household heads had on average fewer than 5 years of education, while 30% are male, about 20% are single, and are on average 40 years old. Household sizes are standard for the region at about 5 people per household. Approximately 15% of the households reported a death in the last 12 months. In 2008, average years of education for the household head increased by a small amount to just over 5 years. For all members of the household, education rates were about 4 years per person. The households reported less than 3 days eating meat in the last week and less than 10% of households reported that remittances were of any importance to household income.

5 Identification and Discontinuities of Displacement

As it is not possible to observe the outcome if a displaced person had not received “treatment” – that is, was displaced, it may be possible to use a relevant control group and estimate the average difference in the outcomes of the treated and controlled groups, i.e. the Average Treatment Effect (ATE). If an appropriate control group can be found, an unbiased estimate of the effect of displacement can be obtained.

The treatment effect can be identified using the assumption of conditional mean independence, where $E(y_0|x,w) = E(y_0|x)$ and $E(y_1|x,w) = E(y_1|x)$. That is, the estimates are unbiased when, conditional on x , treatment assignment and potential outcomes are independent. In the case of displacement, the after movement differences observed between two communities may in fact be due to important innate or predisplacement differences between them and not the displacement itself, leading to biased results. For example, a simple comparison of displaced and nondisplaced communities can produce biased results by potentially comparing households that faced high levels of conflict and moved to those households that faced much less conflict and did not move, confounding the impact of displacement and violence. Also, if the conflict focused on richer communities, either through political concerns or ease of access, such as good quality roads, an estimate of the association between displacement and assets would be biased. Controlling for intensity of conflict cannot alone solve for this endogeneity problem as conflict intensity may also be correlated with poverty.

In order to minimize these selection problems and potential biases, this study analyzes displacement in Lira district, where displacement was at the margin. According to former government officials, who spoke to my research team anonymously, the LRA was unable to penetrate deeply into the district as local populations spoke a different dialect, making movement more difficult and abductions less attractive. This created a change in actual and perceived security through the district that led some communities to be displaced, while others were not displaced. An official describes the movement of the LRA as being based on connections to regions they were already operating in: “Erute [subcounty] was more affected by the LRA activities because it bordered Pader [in Acholiland] where LRA put their bases in many places and hence would extend their actions on the neighboring communities. Dokolo [subcounty] only suffered on the parts which bordered Soroti [another area of conflict]”. The decision of displacement was then a joint decision by local government and military officials based on this

expectation of the ability of the LRA to attack communities. Displacement was not formally decided upon as a clear line, but rather a selection of subcounties that happened to produce a line of displacement.

As shown in Figure 2, displacement was initiated in subcounties closest to the conflict epicenter in Acholiland, in the northwest to middle portions of Lira district. The blue dots represent locations of conflict as reported by the Raleigh and Hegre (2005) database. Raids and violence happened on both sides of the division, but due to proximity to more violent areas in the Acholi region, those in the northeast felt more insecure and left their homes, while those in the southwest stayed home.

However, government military decisions and deployment may not be entirely exogenous, and so some biases may still be present. By focusing on this marginal area of displacement, the boundary discontinuity approach minimizes unobserved differences between displaced and nondisplaced communities and so minimizes the differences in security between displaced and nondisplaced communities. While it is possible that some unobserved selection is still at work, the impact is reduced, and the direction and magnitude of the results are likely minimal.

In addition, better-off households, rather than being displaced, may have moved to communities that were not to be displaced. This is an especially important issue for the BD design, as the physical distance between displaced and nondisplaced communities is relatively short. While we might expect this proximity would facilitate transit, moving in these rural areas is very difficult unless the individuals have strong ties to other areas – as is often the case in northern Uganda. Thus, the more wealthy families that may have moved would have moved to the urban areas and would have likely done so long before the displacement was initiated. While this type of movement was extremely rare, to control for this problem I do not include urban residents in the sample. However, this could further bias the sample, as households in displaced communities where wealthier families moved away would appear to be worse off than they are. I do not have data on migration to urban areas, and to my knowledge none exists. This is a problem for the 2004 data sample, but does not affect the results of the 2008 analysis as the data is based on a panel from 2004. Thus, the 2004 sample may be somewhat upward biased toward the negative effects of displacement in general, but the 2008 sample will still be representative of the recovery of those households observed in the sample.

Table 3 presents the results of a balance test between control variables in the full and border sample for those households displaced and those that were not displaced. Household head sex,

marriage status, income activity, age, and size of household all appear to be well balanced. However the level of retrospectively reported assets in 1999 are higher among the displaced population. This may be due to a mis-estimation of historical assets by these households, or it could indicate that the displaced population was significantly better off than the nondisplaced population predisplacement. This would suggest that any results found in this analysis are an underestimation of the effect of displacement.

Due to the lack of quality data on security and movement, it is not possible to directly test the difference in security between displaced and nondisplaced communities, though it is possible to test for one measure of violence: deaths in the household. The 2004 survey includes questions on the incidence of any deaths in the household over the previous 12 months. Table 3 suggests that there was no statistically significant difference in deaths between displaced and nondisplaced households.

Similar to Black (1999), this BD design looks at communities closest to a division line and so cannot utilize other practical tests often employed for discontinuity designs. There are also some general limitations in the BDD approach. First, the BDD is a local estimate, and so can only describe the effect of treatment on the border sample, not the larger population. The results of placebo tests in section 8 however suggest that it is reasonable to generalize to a larger grouping. Second, there is strong evidence of a change in key variables at the displacement border, but due to bandwidth restrictions, it is not possible to test the discontinuity design through semiparametric or graphical depiction as is often done in regression discontinuity designs. Again, the placebo tests suggest that this is not of concern. Finally, despite attempts to equalize the amount of violence experienced by those displaced and those not, there is still a chance that violence may not be similar between the displaced and nondisplaced communities, and thus the results reflect not just the impact of displacement, but the impact of both displacement and violence. Tests of differential violence levels on outcomes for displaced and nondisplaced communities suggest this is not the case, though violence was part of the displacement, and so it may not be possible to generalize these results beyond conflict based displacement.

6 Empirical Model

The analysis presented here is divided into two time periods: initial ATE of displacement in 2004 and postdisplacement ATE in 2008. I run the following regression model:

$$Outcome_i = \alpha + \beta T_i + \delta X_i + \varepsilon_i \quad (3)$$

where i refers to a household within the data set. T equals one if the household was displaced. X contains relevant demographic indicators of the household, including the education level of the head of the household; whether the head is a male; if the head of the household is single; if the head reports agriculture as their main sector of employment; total number of people in the household; log of the age of the head; and polynomial values for education, size, and age. ε_i is the error term. As entire communities were displaced, standard errors are clustered at the community level. The impact of displacement is thus obtained through the estimate of β .

This regression model is utilized for the level effects of displacement in both 2004 and 2008. It is possible that displacement may not be associated with the same impact across all economic levels and could potentially have a positive impact for certain very poor households; a quantile analysis would then be potentially important. However, quantile regressions require an assumption of rank preservation (Frandsen (2009) and Firpo (2007)). The ideal approach is to estimate across quantiles of pretreatment variables. This can be identified through the following regression model:

$$Outcome_i = \alpha + \beta T_i + \gamma Q_i + \theta T_i \cdot Q_i + \delta X_i + \varepsilon_i \quad (4)$$

Q is a dummy variable representing those households that had the top three quartiles of assets before displacement. θ then is the coefficient of interest for the impact of displacement on this population, while $\beta + \theta$ is the impact of displacement on those with the bottom quartile of assets.

As the end sample sizes are relatively small, I employ a weighted least squares (WLS) framework to improve the efficiency of the results. As discussed by Hirano et al. (2003), WLS weights on the inverse of a nonparametric estimate of the propensity score and produces more efficient and consistent estimation than OLS. Under WLS, the weights used in equations (3) and (4) are:

$$\omega_i = \omega(T_i, v_i, \rho_i) = \rho_i \cdot \pi_i \cdot (T_i/e(v_i) + (1-T_i)/(1-e(v_i))) \quad (5)$$

where ρ_i and π_i are sampling and attrition weights, and $e(v_i)$ is a nonparametric estimate of the propensity score. The propensity score for displaced households in 2004 is a logit equation estimation of what household characteristics predict being displaced. The propensity score for post displacement analysis in 2008 also includes weights for attrition as estimated in Table 1.

The benefit of using this matching technique is that it improves power and may improve the comparability of displaced and nondisplaced households. In addition to the propensity score, I employ sampling probability weights from the 2004 survey and attrition analysis from the 2008 survey. I present below both weighted and unweighted results for comparison. Since attrition from the panel survey was biased towards the displaced population and weighting may not solve biases from this, section 8 also presents a bounding exercise to test if the results are sensitive to attrited displaced household characteristics.

7 Results

The results in this section are divided between the initial impacts of displacement in 2004 when households were still in the IDP camps and had been there for about 2 years, postdisplacement impacts in 2008 when households had returned home for approximately two years, and heterogeneity analysis of the postdisplacement impacts. Estimates of the impact of displacement include a number of robustness checks. Each dependent variable is tested with two WLS regressions, one with controls (my preferred specification) and one without, and a nonweighted OLS regression with controls. I repeat each regression with the border-only sample of displaced households - that is, subcounties that touch nondisplaced subcounties - and nondisplaced subcounties that touch displaced subcounties. This then produces the tightest bandwidth that can be achieved in the BDD.

7.1 Initial Impact of Displacement

I present the results for the impact of displacement on consumption and assets in 2004 in Table 4. Each result is a separate regression, with the reported coefficient being the impact of displacement.

The effect of displacement on consumption is very large and statistically significant. The coefficient results range from -0.285 to -0.433, with values in the border sample being slightly lower. The R^2 values change as expected, with the WLS with controls results obtaining the highest value at 0.25. The impact of displacement on consumption is calculated by taking the

average of the obtained coefficient values and placing them in an exponential function. Displaced households experienced 28% to 35% less consumption than those households not displaced in 2004. Despite support from the international community, displaced households report much lower levels of consumption than those not displaced.

There is also a large and statistically significant impact on assets. The coefficients range from -0.480 to -0.772, which represents on average a 1/2 to 1/3 standard deviation less assets for those displaced. This is a profound impact, especially given that people were able to carry some limited assets with them to the IDP camps. While in the camps, the majority of households were unable to bring or replace assets.

The initial impact of displacement appears to have decreased both consumption and assets for household members. Displacement was clearly a significant negative shock to households. The next section looks at whether this negative effect was persistent for displaced households, or whether people were able to recover from the impact.

7.2 Postdisplacement Effects of Displacement

The results for the impact of displacement on consumption growth and level consumption and assets from 2004 to 2008 are presented in Table 5. The coefficients on level of consumption are significant and suggest that displaced households have 20% to 23% less consumption than those not displaced, an improvement of 8 to 13 percentage points over 2004.

The difference in assets between displaced and nondisplaced households is not statistically significant for four of the six specifications. The size of the results is also small: the difference in assets is only 1/5 to 1/7 standard deviations. Thus, even if this is incorrectly identified as not significant due to low power, the results suggest again a marked improvement over the conditions in 2004.

The remainder of the specifications in Table 5 are not significant. The size of the coefficients on years of education of the members of the households is very small. The size of the coefficients on days eating protein is large at between 0.820 and 1.222 less days eating meat but is only statistically significant for one specification, the OLS for the full sample.

The coefficients on reported importance of remittances for the household are small and insignificant, suggesting that the improvements in household conditions are not due to remittances received. Likewise, the coefficients for number of household members engaged in agriculture is small and not significant, suggesting, contrary to the literature on poverty traps and

risk, displaced households are not moving away from the most important income-generating activity among the population of northern Uganda.

The results suggest that people have begun to recover from displacement. The “imbalance effect” of the neoclassical model suggests that production (and hence consumption), will be decreased due to increases in investment while households catch up to steady-state welfare. We do not see this mechanism occurring here with the full sample, and so it is not yet clear what is driving the recovery. The heterogeneous analysis discussed next on the other hand does suggest movement in line with the neoclassical model.

7.3 Heterogeneous Effects of Displacement

Once households were moved into the camps, much of their consumption, health and education was dictated by the NGOs and the government. For most of the population, as seen in Section 7.1, this presented a significant decrease in consumption. As discussed in Section 3, the impact of displacement may not have been equal for all of the population. This section looks at the heterogeneity of impact through the retrospective asset question asked in 2004. The sample is divided into quartiles. As detailed in Equation 4, a dummy for the top 75% is interacted with the dummy for IDP status. This allows for an estimation of the differential impact between those who were the most poor in 1999 and rest of the population. The results are presented in Table 6.

The coefficients on consumption are statistically significant and suggest that the most vulnerable have not improved their situation since 2004. They have experienced a decrease in consumption of 48% to 55% from 2004 to 2008, perhaps because consumption in the camps was directed by the international community, and so those that had very little may have seen their conditions improve. Consumption levels of the most vulnerable displaced households are 33% of the nondisplaced households across both of the samples.

The coefficients for the interaction of log consumption and being in the top three quartiles of 1999 assets are positive and of a consistent size across the samples. While the individual coefficients for the interaction term are not significant, they are jointly significant with the IDP dummy. This suggests that the better off households experienced a significant amount of recovery since 2004: from a 35% decrease in consumption to only 18%. While still not a full recovery, this is a significant turnaround.

For assets, there is no effect from displacement on the poorest households, but there is a large though statistically insignificant effect for most specifications for those in the top three quartiles.

The effect is between 1/3 and 1/4 of a standard deviation. This is again an improvement from the 2004 results, suggesting that better off households have recovered some physical assets, but are still missing a significant amount.

The effect of displacement on household education is of a large size for those in the top 3 quartiles: members of better off displaced households have 1.2 to 1.5 fewer years of education. The results are suggestive that the better off households reduced investment in education, consistent with the neoclassical growth model.

The results for days eating protein and importance of remittances are of a small size and not significant across all asset levels. However, there is some evidence that the most vulnerable were affected by displacement through a movement from engagement in agriculture. This may be best explained through an exploration of timing of return.

While the majority of households returned from the IDP camps in 2006, timing of return varied. The results (not shown) of the correlation between timing of return and the outcomes described above are not significant for most of the specifications, except for the number of household members engaged in agriculture, which is a large size and statistically significant. On average, returning home one year earlier is associated with having approximately 0.4 more household members working in agriculture. This result is not surprising as those that chose to return home knew that they would be leaving the free food distribution system and would need to provide for themselves. These are also likely richer households, explaining the difference in agriculture activity between the bottom quartile and top 3 quartiles found in the previous section.

8 Placebo, Bounding and Violence Tests

8.1 Placebo test of BD design

In order to test the robustness of the BD design, all of the previous analysis includes estimation of the impact of displacement for two different samples. The first sample includes all of Lira, while the second sample uses only villages in subcounties that bordered the area of displacement. In this way I can test two different bandwidth assumptions.

I now discuss the results of a placebo test over the different sample populations and neighboring populations. Table 7 presents the results of a placebo test in which I compare the household log per capita consumption and asset index in 2004 between the nondisplaced sample

and three bordering districts: Apac/Oyam, Amolatar/Kabermaido and Amuria/Katakwi⁵, as well as a comparison of the full and displaced border sample in Lira. The results show no difference between the consumption levels of the populations, though assets are lower in Lira than in Apac and Amolatar. The results suggest that the comparison population is not unique to the boundary, or may in fact be slightly worse off, and so there is little concern about gradient change near the displacement border.

8.2 Bounding of attrited sample

As discussed in section 4, the level of attrition is relatively low at only 15%. These attrited households though are disproportionately from displaced communities. Weighting on attrition has been included in the main analysis, but this may not solve any biases present from missing displaced households. These households could be either better or worse off than the average nondisplaced household, so the results could be biased in either direction. Table 8 presents a bounding exercise similar to that conducted Karlan and Valdivia (2011), who use a range of assumptions for bounding originally from Horowitz and Manski (2000), Lee (2002), Kling and Liebman (2004). Bounding allows for an estimation of how large the bias from attrition would need to be in order to nullify the results obtained thus far.

New upper and lower effect bounds are created by imputing the outcomes for the missing displaced and nondisplaced households based on increasing (decreasing) the assumptions of outcomes. Outcome means for consumption and the asset index are imputed for the displaced population, minus a predetermined standard deviation of the non-attrited sample in the displaced population. The process is then repeated for the attrited nondisplaced sample, but this time adding a pre-defined standard deviation from the found nondisplaced sample. This creates a range of outcomes that tests how sensitive the results are to the condition of the attrited sample. Columns 1-3 therefore assume that the missing displaced population is better than the average displaced population. Column 4 is the standard result obtained. Columns 5-7 present increasingly worse outcomes for the attrited displaced sample.

The results for consumption are of the same sign and size across all assumptions. Not surprisingly, significance drops for column 2, and is gone for column 1. The results for assets are

⁵ These districts are displayed in Figure 1. At the time of data collection in 2004, Apac and Oyam were one district, as were Amolatar and Kabermaido and Amuria and Katakwi. These districts were since divided as seen in Figure 1 by the 2008 data collection. Likewise, Lira was divided into Lira and Dokolo.

likewise similar across all specifications, again except for column 1, where the effect is very close to 0. None of the specifications, including the standard results, are significant except for the worst-case assumption of column 7. Overall, the bounding results suggest that the main results are not very sensitive to the condition of the attrited sample.

8.3 Test of effect of violence

I have argued that the results presented thus far are capturing the effect of displacement on this population, not the effect of violence per se. Table 9 presents a test of this by comparing, within the displaced and nondisplaced samples, the main outcomes from Table 5 between households that lived in areas where fighting occurred and areas where there was no fighting. Data on fights comes from the ACLED database and is displayed in Figure 2. While it is only the displaced population that is of immediate concern, I also test the nondisplaced population as a comparison.

Within the displaced household sample, there is no significant or large difference between those that experienced fighting and those that did not for consumption, assets, education of family members, or remittances. There is a large positive, but insignificant, effect on protein consumption. There is a large, negative and significant effect on the number of household members engaged in agriculture, which may be due to the fact that fighting happened mostly in agricultural areas.

For nondisplaced households, fighting does not appear to have an effect on consumption, assets, remittances and agriculture activities, though it does have a negative and significant effect on education of household members and a large effect on days eating protein.

Overall, the results are suggestive that violence was a concern in this area, but did not have an impact on the main results of interest.

9 Discussion

The results of this analysis suggest that the impact of the displacement in northern Uganda was initially very severe. Households that were displaced experienced significantly lower levels of consumption and assets than comparable households not displaced. Shortly after returning home, some households have largely recovered, but the poorest households have not.

The results confirm the growth models discussed in Section 3. Conditions have improved for those most likely to be able to change investment toward the physical assets lost during

displacement, but the poorest households appear unable to recover. This leaves the question as to why people are able to recover so much in such a short period of time. The evidence shows that remittances were not a part of recovery. The effect of education on households in the top 3 quartiles of assets may be suggestive of one reason. The effect of displacement on education is not strongly robust, and it is not clear if this impact is due to household decisions to decrease investment or the lack of facilities in the IDP camps, but it does offer some evidence that there may have been a shift from human to physical capital investment, which is consistent with a neoclassical growth model and the predicted “imbalance effect.”

Another possibility is that the NGOs operating in Lira were able to replace these assets and help return people to normal consumption levels. From discussions with NGOs that operated in Lira throughout the displacement time period, from 2006 to 2008 there was some activity targeted specifically toward returning IDPs, though these were mostly small scale projects that targeted relatively few people. Many NGOs focused on water and sanitation works with no impact on asset accumulation. Others did provide animals, such as bulls and goats, but in very small quantities compared to the population. Finally, the WFP supported some small scale agriculture and fishing rehabilitation programs, but again this was small compared to the population, especially in Lira. The majority of programs focused on Acholiland where the effects of displacement were clearly greater.

The majority of programs mainly focused on maintaining basic and vital services, such as health, sanitation and food distribution. This limited involvement, combined with the results presented here, suggests that much of the growth is due to investment decisions of the people. It is clear that by 2008 people were unable to completely recover from the conflict. It is also possible that many of the results here will have implications for long-run effects from malnutrition, loss of human capital accumulation and decreased cognitive development that cannot be explored in this data. However, the results suggest that the poorest households are failing to recover entirely, and so there is likely still a role for the international community and the government of Uganda to help push this population back on to their original steady-state growth path.

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Figure 1: Map of Uganda. The districts in Acholiland, the main center of the conflict, are outlined in blue. The area studied here is outlined in green. Additional districts included in the 2004 and 2008 surveys are also included.



Figure 2: Map of the region of interest. Displaced subcounties are above the red line. Nondisplaced subcounties are under the line. Blue dots represent locations of conflict as reported by the Raleigh and Hegre (2005) database of conflict.

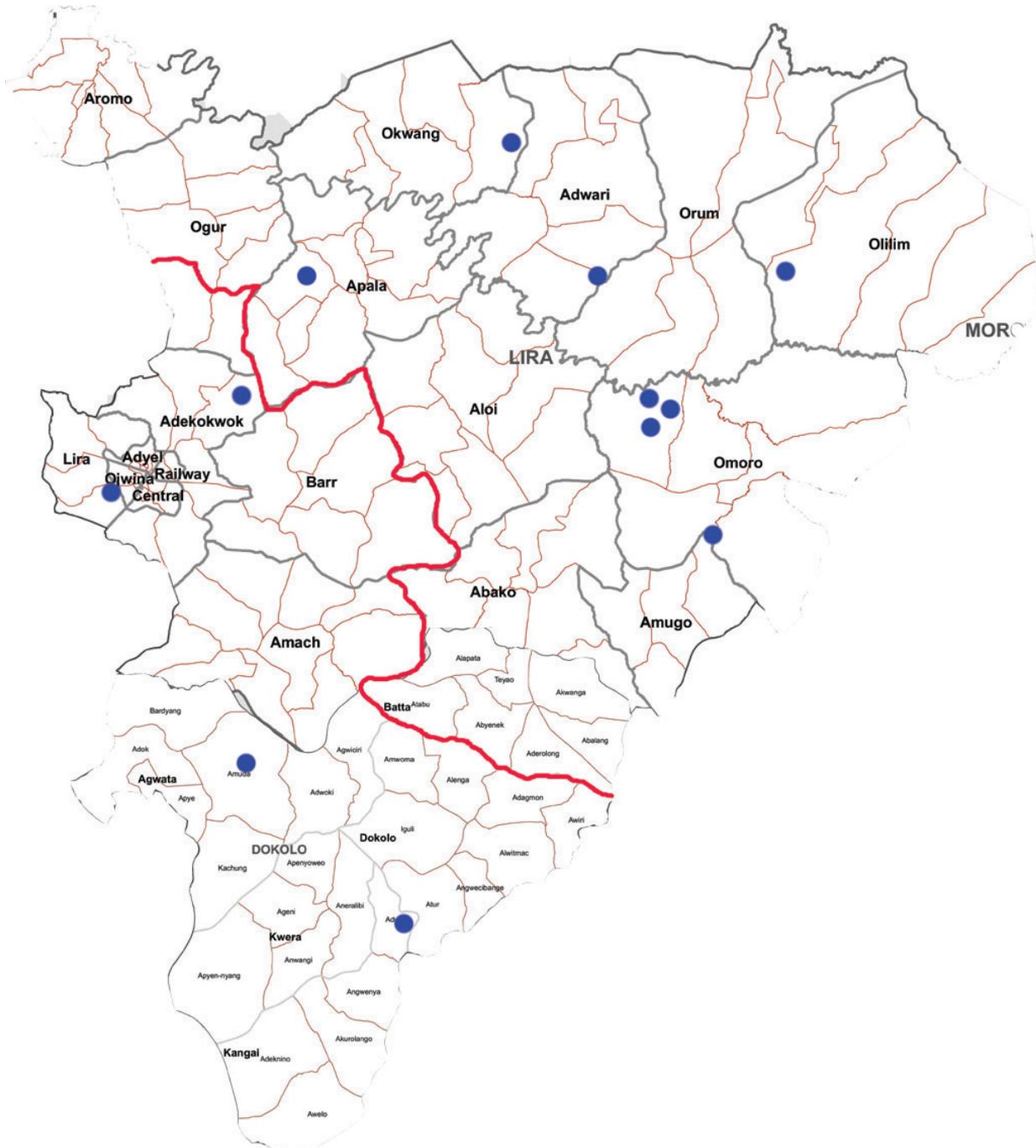


Table 1: Determinants of attrition, estimated using the Logit function

	If found
Does the household reside in an IDP camp?	-1.629*** [0.407]
First principal component assets per person in 2004	0.319 [0.305]
Household head years of education in 2004	-0.016 [0.209]
Household head is a female	-1.029 [0.689]
Household head is single in 2004	-1.029 [1.064]
Household head works in agriculture in 2004	-0.615 [0.540]
Log household head age in 2004	1.796 [11.578]
Size of household in 2004	-0.098 [0.355]
Deaths in household in the last 12 months in 2004	0.782 [0.852]
Observations	220

Robust standard errors in brackets, clustered by community

* significant at 10%; ** significant at 5%; *** significant at 1%

WLS weights are by sampling probability and propensity score

Table 2: Summary statistics

Variable	Sample mean [Std Dev]	
	Full sample	Border Sample
2004	Obs=220	Obs=130
Log consumption per person	9.714 [0.770]	9.754 [0.806]
First principal component assets per person	-0.229 [1.356]	-0.168 [1.436]
Does the household reside in an IDP camp?	0.636 [0.484]	0.587 [0.498]
Household head years of education	4.876 [4.179]	4.905 [4.070]
Household head is a female	0.312 [0.466]	0.291 [0.459]
Household head is single	0.245 [0.433]	0.249 [0.437]
Household head works in agriculture	0.187 [0.392]	0.207 [0.410]
Household head age	41.107 [14.152]	39.346 [13.93]
Size of household	4.827 [2.093]	4.813 [2.194]
Deaths in household in the last 12 months	0.149 [0.358]	0.168 [0.378]
First principal component assets in 1999	0.033 [1.326]	-0.06 [1.245]
2008	Obs=186	Obs=116
Log consumption per person	10.441 [0.739]	10.415 [0.743]
Change in consumption per person	0.675 [0.924]	0.621 [0.882]
First principal component assets per person	-0.129 [1.447]	-0.035 [1.547]
Household head years of education	5.384 [4.253]	5.006 [3.907]
Average years education for all household members	3.968 [1.936]	3.844 [1.934]
Household days eating protein	2.544 [3.164]	2.153 [2.977]
Household importance of remittances	0.068 [0.254]	0.098 [0.301]
Number of household members in agriculture	1.778 [1.085]	1.750 [1.085]

Table 3: Balance test for 2004 variables

Variable	IDP vs. Non-IDP	
	Difference in means [Std Error]	
	Full sample	Border Sample
	Obs=220	Obs=130
Household head is a female	0.025 [0.072]	-0.038 [0.088]
Household head is single	-0.021 [0.062]	-0.04 [0.097]
Household head works in agriculture	-0.046 [0.049]	-0.039 [0.068]
Household head age	2.668 [2.439]	4.242 [3.023]
Size of household	-0.257 [0.271]	-0.006 [0.428]
Deaths in household in the last 12 months	-0.053 [0.049]	-0.098 [0.064]
First principal component assets in 1999	0.9678*** [0.177]	0.8479*** [0.199]

Robust standard errors in brackets, clustered by community

* significant at 10%; ** significant at 5%; *** significant at 1%