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Multidimensional Impact Evaluation: a randomized control trial on conflict-affected women in Northern Uganda

Bilal Malaeb¹ and Eustace Uzor²

Abstract

This paper applies the Alkire-Foster measurement approach to evaluate a randomized control trial that aimed to empower ultra-poor and conflict-affected women in two most war-affected districts in Northern Uganda through the Women's Income Generating Support Program (WINGS). Using a multidimensional measure of ten indicators, we find that the intervention is successful in reducing the average number of deprivations by the equivalent of half a binary deprivation. Analysis of the adjusted headcount ratio shows that the intervention was successful in reducing multidimensional poverty and disempowerment among those who experience it more severely. However, we find that, even at endline, most of the women in the sample experience at least three of the ten deprivations simultaneously. The multidimensional approach to impact evaluation is a demanding requirement on any intervention that aims to reduce poverty as it requires the intervention to simultaneously enhance intended outcomes for every beneficiary. Nevertheless, it can be claimed that these conflict-affected women should not experience any of these deprivations at once.

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I. Introduction

Ending (extreme)poverty in all of its forms everywhere around the world continues to dominate the International Development Agenda (UN 2015)³. However, while poverty is declining in much of the developing world, data from the World Development Report (WDR) *Conflict, Security, and Development* (World Bank 2011a) reveal that fragile and conflict-affected states are lagging behind. The report points out that ‘[P]overty rates are 20 percentage points higher in countries affected by repeated cycles of violence over the last three decades’⁴ (World Bank 2011b, 1). Indeed, with the world’s extreme poor overrepresented in fragile and conflict-affected states (World Bank 2007; Burt, Hughes, and Milante 2014)⁵, some authors argue that violent conflict is development in reverse (Collier et al. 2003). Yet, others such as Putzel and Di John (2012, ii) argue that ‘...conflict is ubiquitous and a normal condition for human existence...’, and thus is inevitably progressive. Regardless of which school of thought, what is evident is that the drivers, dimensions, and distribution of poverty in fragile, conflict, and violent contexts are fundamentally different.

The central analytical focus of this paper is the multiple dimensions of poverty faced by conflict-affected and ultra-poor women in two of the most war-affected districts in Northern Uganda: *Kitgum and Gulu*. It explores a human and capital transfer intervention – the Women’s Income Generating Support (WINGS) program - implemented by the Association of Volunteers International Service (AVSI) (Annan et al. 2017). It has long been stressed that women and other vulnerable groups (i.e., children) suffer disproportionately during and after conflict, and therefore experience deprivations differently (Siegle 2010). Poverty in these settings is gendered, involving a combination of multiple sources of deprivation such as loss of income; personal security; sexual violence, breakdown of social capital, and other factors (Siegle 2010). Providing women access to economic opportunities by creating income-generating activities, and promoting participation in the public sphere can, therefore, facilitate poverty reduction – and peacebuilding, in conflict-affected contexts (Siegle 2010). The linkages between women’s economic empowerment and increased investments in the education and health of children at the household are also well established in the microeconomics literature.

This paper, therefore, relates to three strands of literature: research on gender and poverty in post-conflict contexts (Justino et al. 2012; Zuckerman and Greenberg 2004), women empowerment and social capital in post-conflict reconstruction (Blattman et al. 2016; Duflo 2011; Buvinić and Furst-Nichols 2016), and the nascent literature on multidimensional impact evaluation. Our findings contribute to the literature in several ways. Methodologically, this paper pioneers the use of ‘multidimensional’ impact evaluation in a post-conflict and fragile context, which is scarce in the literature. It illustrates the use of the Alkire-Foster method (AF method, hereafter) in evaluating program outcomes and its merits as a tool for impact evaluation. At the policy level, our approach provides insights on the effectiveness and efficiency of poverty reduction initiatives, especially given

³ Goal 1 of the Millennium Development Goals (MDGs) and the Sustainable Development Goal (SDGs), respectively.

⁴ It further shows that every year of violence in a country is associated with a lag in poverty reduction of nearly one percentage point. World Bank (2007) also shows that low-income countries record an average poverty rate of 22 per cent, while fragile and conflict-affected countries experience an average poverty rate of 54 per cent.

⁵ While 9% of the developing world live in fragile and conflict-affected states, they account for 25 per cent (261 million) of the world’s extreme poor.

strict budget constraints faced by developing countries. We draw conclusions on the need to implement multi-sectoral and interlinked policies in order to achieve the sustainable development goals to advance the understanding the heterogeneous effects on poverty, as noted by Banerjee, Duflo, and Shapiro (2011). The study's findings can inform post-war reconstruction policies for both women and the society.

More insights about the extent of poverty can, therefore, be generated with a multidimensional approach. Moreover, the AF method which we use is a more direct way of capturing the 'overall' performance of program interventions with multiple outcome indicators. (Robano and Smith 2014; Loschmann, Parsons, and Siegel 2015). To our knowledge, only the work of Robano and Smith (2014) has explicitly used this approach, but in a normal setting. By providing a unified framework for measuring the impact of a program on poverty, our analyses overcome the main limitation of traditional impact evaluations which narrowly focuses on single outcome variables. The AF method examines both the incidence and joint distribution of deprivation across the target population.

The rest of this paper is structured as follows. Section 2 provides the country context, an overview of the WINGs program, and the multidimensional definition of poverty. Section 3 provides the research design and conceptual framework of the WINGs program. It also presents the theoretical models for assessing the impacts of the program. The empirical methodology is presented in Section 4, while results and robustness checks are presented and discussed in Section 5. Section 6 concludes with policy recommendations and directions for future research.

II. Background and Country Context

This section builds on the scholarship on poverty in post-conflict and fragile states. Firstly, conceptual clarity is provided around the concept of state fragility. Thereafter, it explores the debate around the conflict-poverty nexus. The section continues by examining Uganda's 20 years conflict, and how it underdeveloped Northern Uganda. Finally, it embeds the paper's analyses of poverty within Sen's Capability Approach, which argues that poverty is multidimensional in nature.

What happens when the state is incapable or ceases to perform its core Weberian functions to its population? In conflict or fragile environments, the state usually deviates from the provision of a full range of positive public (and political) goods and services. With the underprovision of public goods (i.e., health, education, security, and justice) in conflict-affected settings (Collier et al. 2003), it can be argued that the welfare of household members decrease - at least in principle. Blattman and Miguel's (2010) examination of war's (internal armed conflicts) economic legacies support this premise. Evidently, the poverty-conflict nexus is complicated and the reverse causality between the two elements has been established.

A. The Ugandan Conflict

Present-day Uganda is a politically stable country, with a record of remarkable economic performance (in terms of economic growth) despite decades of violent conflict. For an economy that emerged from two decades (1986-2006) of a seemingly brutal armed conflict between the Government of Uganda (GoU) and the Lord's Resistance Army (LRA) (Tapscott 2017; Blattman et al. 2015), the above performance is striking. In terms of income-poverty, Lawson, McKay, and

Okidi (2006, 1225) find that although majority of poverty declined between 1992 and 1999, a substantial minority were left behind while others fell into poverty.

This background of strong macroeconomic performance, however, masks stark geographic differences in the distribution of extreme poverty in Uganda, especially in the northern region⁶ where the fighting was concentrated. Using a nationally representative panel data (1992/1999) on poverty incidence, Lawson, McKay, and Okidi (2006, 1231) showed that [o]ne third of chronically poor households in Uganda reside in the Northern region, compared to just over one seventh of the population'. In the same period, official statistics from the Government of Uganda (2007) reveals that the percentage of people who are unable to meet their basic needs in the northern region declined marginally from 72 percent in 1992 to 60 percent in 1997⁷.

Subsequent barbarous acts perpetrated by soldiers/rebels from GoU soldiers, the Joseph Kony-led LRA, as well as the Holy Spirit Movement (HSM) of Alice Lakwena (Allen 2006), can be argued to have 'reversed development' in Northern Uganda. As shown by Blattman and Miguel (2010), many rural households in the northern Uganda, especially in Kitgum and Gulu, lost nearly all their assets⁸ (i.e., livestock, farmland, homes, household durables savings) during the conflict.

B. Livelihood Strategies of Women in Post-Conflict Northern Uganda

Before assessing the impact of WINGS program on women's well-being, it is central to understand the ways through which the violent conflict in Northern Uganda affected women – including changes in gender roles, and what recovery strategies did they use to sustain their livelihoods post-conflict. While Northern Uganda's civilian population faced extreme violence from marauding LRA rebels and GoU soldiers, women experienced these traumas differently due to gender. Expectedly, several reports and studies documented rape, assault, abuse, and human right deprivations.

Research has found that women take up the role of household heads and breadwinners in post-conflict environments. Evidence from several post-conflict settings including Nepal, Cambodia, Columbia, Bosnia and Herzegovina, Rwanda, Mozambique, and Rwanda support the thesis of female and widow-headed households (Justino et al. 2012). While this linkage is mediated by male deaths and physical disabilities suffered during wartime (Ahikire, Madanda, and Ampaire 2012), some authors such as Justino et al. (2012) argue that women increase their labor force participation in post-conflict situations, in contrast to men. Furthermore, evidence suggests that the women in Northern Uganda were forced to change their source of livelihood from subsistence agriculture before the war to informal petty trading post-conflict (Ahikire, Madanda, and Ampaire 2012).

C. Why Multidimensional Measures?

Poverty, empowerment, and wellbeing are increasingly recognized as multidimensional phenomena (World Bank 2017). Through various essays (Sen 1981; Sen 1999), Sen argues that ill-being manifests in the inability of an individual to achieve freedom and valuable functionings – *beings*

⁶ Especially in Gulu, Kitgum, and Pader Districts.

⁷ The GoU points out that the poverty rate has remained 64 % since 2004.

⁸ There is evidence in the literature to suggest that land and livestock are important assets in northern Uganda's largely agrarian economy.

and doings – required to live a life they have reasons to value. Sen’s definition of poverty differs considerably from the mainstream concepts of poverty in the development literature. While concepts such as the poverty line defines poverty within the domain of resources such as income, poverty in the capability approach is viewed as deprivation in two core dimensions: the lack of agency and real opportunities needed for an individual to achieve valued functionings such as quality education and good health, in their daily life. Furthermore, the capability approach examines the interdependence between individuals and the wider society, given that this linkage can enhance or erode individual-level capabilities. This notion of social (in)exclusion embedded in the capability approach is essential to understanding the extent of deprivation faced by poor people in conflict-affected environments. The capability approach, therefore, recognizes individuals to be active actors in their own development.

In measures of multidimensional poverty the aim to reflect human capabilities such as the AF family of measures, is a key challenge encountered by researchers is the selection and design of appropriate functionings, weights, and cut-offs (Alkire and Foster 2011a). While any index is sensitive to the underlying normative choices made by the researchers. In the following sections, we present the theoretical underpinnings of the choices of our indicators relative to the program’s intended outcomes.

III. The WINGS Program – Phase 1

A. The WINGS Intervention

The WINGS intervention was implemented in two Phases (I&II) between 2009 and 2012 to develop new economic opportunities and build the social capital/network of mostly conflict-affected young women aged 14-35 years in Northern Uganda (Blattman et al. 2013). Economic and social empowerment were viewed as crucial ingredients for reducing extreme poverty and improving the health, education, and psychosocial well-being of the program’s beneficiaries. AVSI and IPA, the implementing partners, identified 15 poorest and most vulnerable people in 120 war-affected villages in *Kitgum and Gulu*. WINGS aimed at removing the constraints faced by vulnerable young women in running successful businesses. The program had three core components: i) an unconditional individual cash grant (\$150) to start a small business such as petty trading; ii) 5 days training on business skills & plan development; iii) regular follow-up visits by trained community workers; and two ‘optional’ components: i) 3 days group dynamics training to help them form self-help groups and rotating savings and credit association (ROSCA); and ii) spousal inclusion, training & support (Blattman et al. 2016).

B. Research Design

In Phase 1 of the WINGS program, 60 out of the pre-selected 120 villages were randomly assigned to receive treatment. Beneficiaries were also randomly allocated to various components of the program (see Appendix 1). The remaining villages (control group) were randomized into a waitlist for treatment in Phase II. Of course, the anticipation of treatment by participants in the waitlisted villages can arguably alter their behavior and hence bias the program’s impacts. If a change in the behavior of program beneficiaries in the control group leads to underreporting, then, their deprivations are likely to increase or remain the same, which will inflate the impact. Similarly, if achievements are over-reported, the real impact of the program will be larger than our findings.

However, Blattman et al. (2016) find that the program's results were robust to experimenter demand effects, which is a risk due to self-reported measures. Supposing that misreporting is systematic across both groups (treated and control), the paper's use of difference-in-difference method is likely to remove any measurement error. Given the size of impacts that we find, the bias seems unlikely to drive our results.

Phase 1 of the WINGS program comprised of 1800 program beneficiaries, most of whom were young women (1537 at baseline and 1474 at endline). The average participant in the program was female, 27 years old, and had 2.8 years of education while half were married or partnered. Furthermore, program beneficiaries reported having worked 15 hours weekly in the past month, mainly in their own agriculture. Only 3 percent did petty trading or engaged in any business activity. Some program beneficiaries, women, were conscripted into the army, or forcibly married and bore children during the war in Northern Uganda. With the absence of better outside options prior to the violent conflict, its effect on women's asset accumulation, education, and other non-economic factors was minimal. Blattman et al. (2016) find that treatment participants were slightly worse off in durable assets ownership, employment, literacy, savings group member, participation in armed groups, as well as receiving family and community support. These differences at baseline are however illustrative and not indicative of the quality of the randomization.

This paper focuses on Phase 1 of the WINGS program, mainly because our empirical strategy, difference-in-difference, requires both baseline and endline data for the control and treatment groups. In the absence of a clear comparison group, such as in Phase II, it will be difficult to establish the assumption of parallel trends. At endline, Blattman et al. (2016) find statistical increases in starting an enterprise; working in both agricultural and non-agricultural enterprises; income; consumption; durable assets; and food security. Improvements were also observed in program beneficiaries that were randomly assigned to participate in group dynamics training. Conversely, the WINGS program had no effect on the physical health, quality of relationships with family, autonomy in making market purchases, average hours spent on chores per day, as well as domestic violent (physical and emotional). Appendix 1 presents the experimental research design (with timelines) used in implementing the WINGS program.

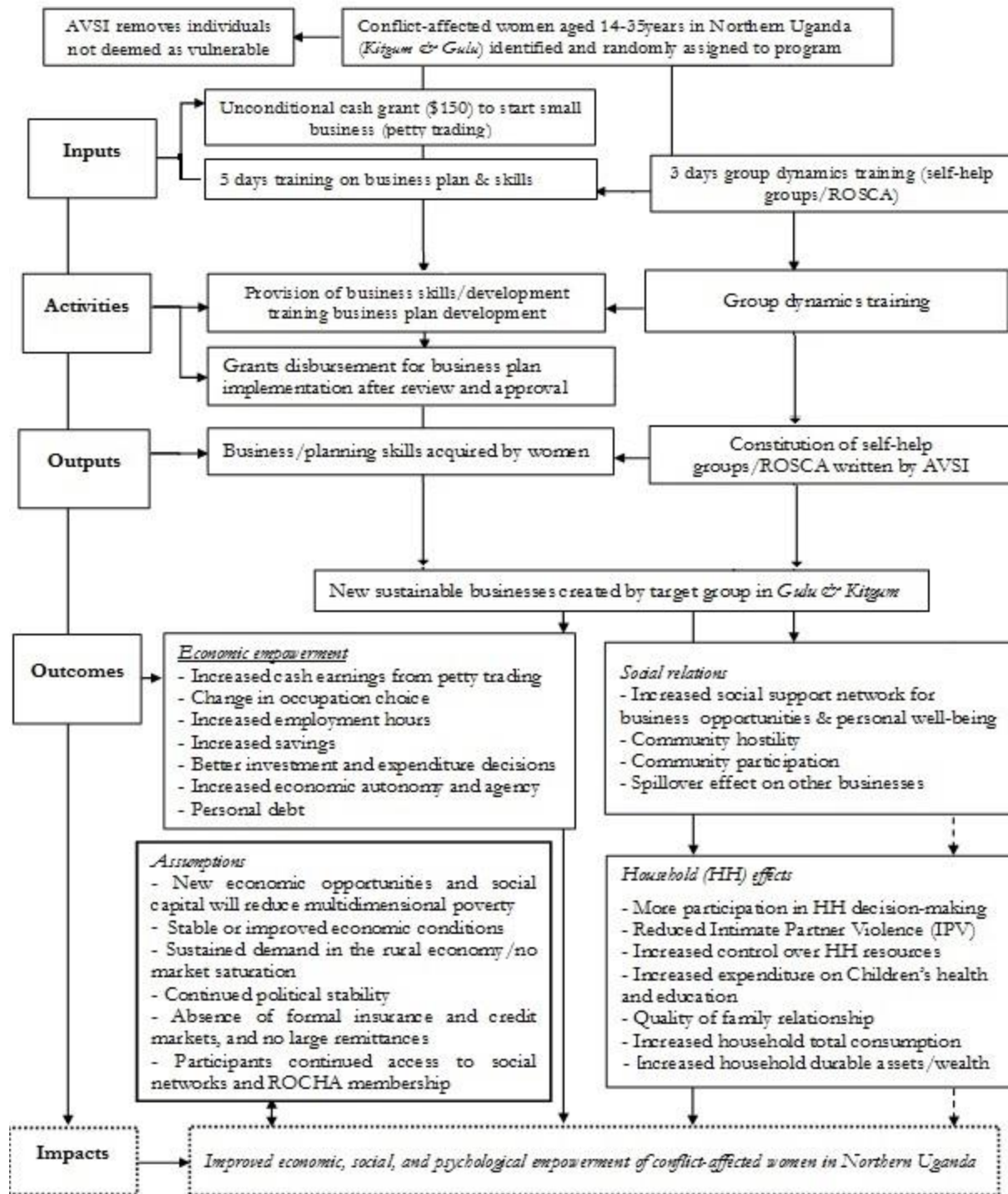
C. The Theory Underlying the WINGS Program

This section explores the question every evaluation starts with: What is the impact or causal effect of the program on the outcome of interest?⁹ That is, how is the WINGS program expected to achieve its impacts? In Figure 1 below, we articulate the conceptual framework, or *theory of change*¹⁰ for the WINGS program, highlighting its inputs, activities, and the underlying assumptions behind the casual pathways required to achieve its outcomes and impacts. Imas and Rist (2009) argue that a program theory must identify the conditions under which the intervention will achieve its desired objectives. This is particularly relevant in our program of focus (WINGS), considering that it was implemented in a humanitarian setting with several aid actors.

⁹ see Imas and Rist (2009)

Two related logic models underlie the WINGS program. The first relates to relaxing credit constraints (start-up capital for non-farm enterprises) and human capital constraints (business skills) without which the program's beneficiaries cannot transit from subsistence agriculture to non-farm (self)employment. The second refers to rebuilding the social capital/network of the war-affected women through increased social interactions from voluntary memberships in self-help groups. Indeed, the breakdown of trust and social networks is one of the key legacies of violent conflict and war and is known to create new classes of the poor.

Figure 1: Conceptual Framework of WINGS



Source: Authors, with information from WINGS program documents

At maturity, the self-help groups are expected to morph into associations that carry out financial intermediation and risk-pooling between members, permanently removing credit constraints. Therefore, the key assumption behind the WINGS program is that lack of new economic opportunities in ‘nonfarm (self)employment’, skills, and low levels of social

capital/network are responsible for extreme poverty and perverse outcomes in education, health, and psychosocial well-being of war-affected young women. The cause-effect linkages behind the WINGS program can be explained by ‘if-then’¹¹ statements (i.e., if unconditional grants are disbursed after approval of the business plan, then program beneficiaries will create new sustainable businesses- petty trading). Figure 1 presents various steps in the causal link. White and Nelson (2007) point out that if the program design fails in any of the steps (as in figure 1) or if an activity is executed ineffectively, then there is either a missing or weak link. Thus, the desired program objectives cannot be achieved.

In principle, the WINGs program is similar to the Building Resources Across Communities (BRAC)¹² ‘Targeting the Ultra-Poor Program’ (TUP) in that both aim to improve the physical, human, and social capital of the extremely poor through transfer of assets (Emran, Robano, and Smith 2014; Robano and Smith 2014). However, as noted by Blattman et al. (2016), WINGS differs along some key dimensions, specifically: i) an exclusive focus on young women aged 14-35, ii) fewer program components, iii) focus on petty trading, iv) cash transfer rather than asset transfer (e.g. livestock), and v) it is situated in a post-conflict environment.

For instance, using a series of randomized control trials conducted in six countries, Banerjee et al. (2015) found that TUPs generated improvements in household consumption¹³, assets, food security, as well as incomes and revenues among program beneficiaries in every country. With a focus on poor Bangladeshi women, Bandiera et al. (2017) show that BRAC’s nationwide TUP significantly shifted the occupational choice of targeted beneficiaries from casual labor to farm self-employment. Most importantly, the substantial increases in household consumption, asset accumulation, and poverty reduction were sustained after four and seven years. Yet, the success TUPs comes with a caveat. Specifically, Robano and Smith (2014, 1) argue that its ability to reduce extreme poverty is conditioned on whether beneficiaries are able to accumulate assets ‘above and beyond any assets transferred by the program’. Indeed, the poor’s depletion of their assets due to extreme vulnerability to external risks such as illness and house damage could explain the relapse into extreme poverty. Thus, there is a consensus that the importance of any intervention lies in its long term sustainability.

D. Theoretical Framework

In this section, we further examine key theoretical frameworks in the literature that underpin the causal pathways and linkages in the WINGS program. However, our aim is not to provide a thorough review, but to provide a scientific basis for examining the program’s cause and effect relationships.

i) Occupational Choice Model

Extremely poor people are usually deprived in the capabilities they need to engage in productive employments with high-returns (Banerjee and Duflo 2007; Sen 2004). Clearly, the lack of capabilities keeps them below the poverty line. It can be argued, therefore, that a program which relaxes some

¹¹ See Imas and Rist (2009)

¹² BRAC was initiated by Fazle Hasan Abed in 1972 in Bangladesh. Its TUP programme has since been replicated across several countries.

¹³ Except in Honduras

(or all) of these constraints can instigate *positive* occupational changes, and thus alleviate poverty (Bandiera et al. 2017; Bandiera et al. 2013). In Northern Uganda, conflict-affected women are faced with the occupational choice of how many labor hours to allocate to subsistence agriculture and casual labor (both labor-intensive), and a capital-intensive small enterprise (farm and non-farm) (Blattman et al. 2016). To shift their labor hours to the latter occupation, these vulnerable and extremely poor women face four interrelated constraints: lack of credit/finance; imperfect insurance (i.e., risk-sharing); low business skills; and present-bias tendencies.

To what extent did the inputs of the WINGS program (figure 1) relax these binding constraints? First, lack access to start-up capital was *directly* relaxed by a large unconditional cash transfer, which was 30 times larger than beneficiaries baseline earnings (Blattman et al. 2016). Second, group dynamics training which encouraged social interaction stimulated labor-sharing and risk-pooling. The doubling of debt in the treatment group vis-à-vis the control group though a perverse outcome, suggest that it was a rather effective to removing insurance constraints. Third, five (5) days of business skills development training and planning increased beneficiaries business skills. Last, present-bias tendencies were resolved by on-going follow-up supervision of beneficiaries by community workers. A formal treatment of these constraints using the ‘Ramsey model of occupational choice and investment with heterogeneous agents’ is presented in Blattman et al. (2016b, xi). Bandiera et al. (2013) provide a similar theoretical model of occupational choice for extremely poor women in Bangladeshi. However, their model is different from WINGS in two respects: they explicitly modeled leisure, and the BRAC’s TUP the evaluated transferred physical assets to the poor instead of cash.

ii) Social Capital/Network in Northern Uganda: Empowerment or Disempowerment?

In his novel work on *Making Democracy Work: Civic traditions in Modern Italy*, Putnam (1993, 167) defined social capital as ‘features of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions’. In the WINGS program, social capital is defined as the value found in a beneficiary’s social network (Blattman et al. 2013), entailing that it can either be negative or positive. Specifically, the intervention aimed at improving beneficiary’s outcomes in the following dimensions of social capital: group participation, leadership, trustworthiness, collective action, social cohesion, and inclusion. Regardless of the definition used, the concept of social capital is particularly relevant for conflict-affected and post-conflict settings such as Northern Uganda, where violent conflict has destroyed¹⁴social capital and sowed the seeds of mistrust (Rohner, Thoenig, and Zilibotti 2013).

A growing body of literature shows that violent conflicts destroy/disrupt social capital, making it more challenging to escape poverty (Collier et al. 2003; Zuckerman and Greenberg 2004; Blattman and Miguel 2010). Even in normal settings, extremely poor people are often deprived in the above-mentioned dimensions of social capital. (Hossain and Matin 2007). Indeed, while social capital delivers economic returns to the poor (Feigenberg and Pande 2013), it also serves as a mechanism for disempowerment and social liability (Giné and Karlan 2014; Mayoux 2001). In the latter line of thought, evidence on how poor people’s social capital is often mobilized against their interest is well documented in both the micro-credit literature (Mayoux 2001).

In the aftermath of armed conflict in Northern Ugandan between 2002 and 2005, for instance Rohner, Thoenig, and Zilibotti (2013) find that the extent of fighting had large and statistically significant causal effects on ‘trust towards other Ugandans’ (249). Similarly, using trust and associational membership as proxies for social capital, Luca and Verpoorten (2015) find that both variables were affected by the armed conflict in Uganda. In light of this, one of the key development objectives of the GoU in the Peace, Recovery, and Development Plan (PRDP) of Northern Uganda is to rebuild social capital in Northern Uganda (Government of Uganda 2007). GoU’s effort is underpinned by the argument that social capital provides extremely poor people with the resilience to sustain their livelihoods post-conflict.

Durlauf and Fafchamps (2005, 1692) show that the ‘role of [social] networks in facilitating beneficial exchange is one of the most compelling empirical findings in the social capital literature’. However, despite the benefits attributed to social capital, there is evidence to suggest that it exposes poor people to indebtedness through ROSCAs. In this regard, Adams and Von Pischke (1992) argue that debt is an ineffective tool in improving the economic lives of the poor, while Wright (1999) argues that acute indebtedness is a form of deprivation that even extremely poor people avoid.

E. Tying it all together: Women Empowerment, WINGS, and Poverty Reduction

Women’s empowerment is central to the pursuit of economic and human development (Sen 1999; Green et al. 2015; Batana 2013). As noted by UNDP (2007, 120), it is ‘both a goal and a driver of human development’, and reflects the *capacity* to make *effective choices* which translate to desired outcomes. This entails economically empowering women and girls alike, as well as enhancing their power and agency to lead a life they have reasons to value (Perezniето and Taylor 2014). There is, of course, a wide range of what women’s empowerment means in the literature (Batana 2013; Kabeer 2005; Duflo 2011), however, scholars agree that it comprises of economic, social, and political dimensions (Bandiera et al. 2014; Blattman et al. 2013). Despite suggestive evidence that women’s empowerment is positively associated with improved development outcomes such as poverty alleviation (UNDP 2007), some authors (Blattman et al. 2013) contend that empirical evidence on how best to empower ultra-poor women in is mixed and limited.

Antipoverty programs such as WINGS typically aim to increase women and girl’s control over household decision-making, resources, as well as greater choice in reproductive dimensions including childbearing, marriage, and sexual activity¹⁵ (Amudha and Banu 2009). By providing a large cash grant and business skills training, the WINGS program was designed to firstly improve the income and material well-being and the capabilities of targeted beneficiaries. It is argued that women’s economic empowerment leads to a renegotiation of gender relations within the society, thus translating to social and political empowerment (Mayoux 2001). Thereafter, increased participation in social and economic networks is expected to generate *sufficient positive* social capital to bind the interlinkages between the economic, social, and political domains of empowerment. To

¹⁵ In the WINGS Program, women’s empowerment is narrowly defined as ‘...such as greater independence from their male partners, increased control over household resources, or more participation in household decision-making’ Blattman et al. 2013, 10). We do that explore the reproductive dimension of women’s empowerment given data limitations.

empower extremely poor and conflict-affected-women therefore, the WINGS program needs will have to improve the ‘...ability of women to access the constituents of development—in particular health, education, earning opportunities, rights, and political participation’ (Duflo 2011, 1053).

IV. Empirical Methodology

A. The Alkire-Foster Multidimensional Poverty Measures

The paper uses the multidimensional poverty – or joint deprivations - measurement approach of (Alkire and Foster 2011a), henceforth the AF method. Following Sen's (1976) view that conceptualizing poverty requires identification of who is poor and aggregation of the information about poverty across the society, the AF method identifies who is poor using a dual cut-off criterion. It identifies individuals as poor if deprived in a specified number of dimensions ($k > 0$), and defines individuals as ultrapoor if deprived across a sufficiently large number of dimensions. This number of deprivations constitutes the multidimensional poverty cutoff, akin to the monetary poverty line. Thus, under a multidimensional poverty framework, poverty is a shortfall from a specified threshold on each dimension of an individual's well-being. In this paper, we use the words poverty and disempowerment interchangeably, as the essence is measuring the joint deprivations experienced by women of the WINGS program and along the program's intended outcomes.

B. Who is poor/disempowered?

Let n be the number of individuals in the WINGS program, and d be the number of poverty dimensions under consideration. As indicated in table 2, below, 10 indicators are structured within these four dimensions of disempowerment. The data is contained in an $n \times d$ matrix, where the ij th represents the value of the j th variable for an individual i . The poverty cutoffs are represented in a vector C of length $d + 1$, with entries c_j for $j = 1, 2, \dots, d$ indicating the poverty line for the dimension j and $c_{d+1} \in \{1, 2, \dots, d\}$ specifying the minimum number of dimensions in which a program beneficiary must be deprived to be classified as poor. If we define the $n \times d$ matrix Y containing information on individuals and cutoffs, the deprivation matrix G^0 below defines an indicator of whether an individual i is deprived in dimension j , or not.

$$g_{ij}^0 = \begin{cases} 1 & \text{if } y_{ij} < c_j \\ 0 & \text{otherwise.} \end{cases}$$

Furthermore, given a vector of D dimensions defined below (10 in our case), an individual is considered poor if $d_i \geq c_{d+1}$.

$$d_i = \sum_{j=1}^d g_{ij}^0$$

With this two-step counting approach (i.e., c_j ; c_{d+1}) of identifying who is poor, we can vary the second cutoff to capture conflict-affected women that have more breadth of deprivations. This flexibility of varying the second poverty cutoffs is one of the key advantages of the AF method over the union and intersection approaches to measurement of multidimensional poverty.

C. Aggregating the index

A series of multidimensional poverty measures can be derived after identifying who is poor using a specific poverty cut-offs vector \mathbf{C} and c_0 (Alkire and Foster 2011a). If an n -dimensional vector (Q) is defined as:

$$q_i = \begin{cases} 1 & \text{if } d_i \geq c_0 \\ 0 & \text{otherwise} \end{cases}$$

Then, the proportion of the population identified as poor, or the average incidence of poverty (*head-count ratio*) experienced by individuals will be:

$$H = \frac{1}{n} \sum_{i=1}^n q_t$$

Given that H is not responsive to changes in the deprivation of individual across dimensions, except when they become non-poor (Trani, Jean, and Cannings 2013), the breadth or *intensity of poverty* (A) is derived as follows:

$$g_{ij}^{0*} = \begin{cases} g_{ij}^0 & \text{if } q_i \geq 1 \\ 0 & \text{otherwise} \end{cases}, \text{ and then } A = \frac{\frac{1}{d} \sum_{i=0}^n \sum_j^d g_{ij}^0}{\sum_{i=1}^n q_i}$$

After the average deprivation share across the multidimensionally poor is derived (that is, average deprivations in d dimensions), the *adjusted head-count ratio* (M_0) is derived as follows:

$$M_0 = \frac{1}{n} \sum_{i=1}^n \sum_{i=0}^n g_{ij}^{0*} = H \times A$$

Also, considered dimensions are weighted using a weight vector ($w = w_1, \dots, w_d$), with the sum of weights equal to 1.

D. Multidimensional Impact Evaluation of the WINGS program

We estimated the impact of the WINGS program using a difference-in-difference (DID) estimator, at various poverty thresholds. Our estimator of program impact is the difference in the difference in the multidimensional poverty measure, M_0 and H , for the control and treated groups at baseline and endline, respectively. The measures capture all deprivations experienced by an individual (Emran, Robano, and Smith 2014; Robano and Smith 2014).

Participants in the WINGS program were randomly selected as shown in Appendix 1, thus, overcoming issues of selection bias and an unreliable counterfactual. Regarding the assumption of a parallel trend between the treated and control group, Blattman et al. (2016) found that unobserved characteristic affecting the participation in the program did not vary over time with treatment status. We can, therefore, credibly estimate a DID estimate within a regression framework with the following equation:

$$Y_{it} = \alpha + \beta(T_{i1} \times t) + \rho T_{i1} + \gamma t + \delta X + \varepsilon_{it}$$

Where Y is our multidimensional outcome measure, the DID estimator (β) equals: $E(Y_1^T - Y_0^T | T_1 = 1) - E(Y_1^C - Y_0^C | T_1 = 0)$, where $T_1 = 1$ indicates treatment with WINGS program at $T_1 = 1$, while $T_1 = 0$ denotes the control group that did not receive treatment, and X is a set of control variables.

E. Dimensions of (dis)empowerment, cut-offs selection, and data

The dimensions, indicators, (dis)empowerment cut-offs, and the weights used considered in this paper are presented in Table 2 below. The analysis is conducted at the individual level (i.e., WINGS program Phase I participants). This dimensions and indicators used for the paper's analysis were derived from WINGS survey questionnaire administered at both baseline (2009) and endline (2011). The five dimensions were weighted equally with a weight of 1 or 1/5 in relative terms, while each of the indicators was assigned a weight of 1/10.

The first dimension, *empowerment*, relates to women's agency and participation in household decision-making as well as gender norms. As pointed out earlier, empowerment is a key aspect of Sen's capability approach. Realizing gender equality and the empowerment of young women is therefore both a development goal (SDG 5) (UN 2015) in itself, as well as instrumental to the achievement of other development outcomes such as improving investments in the health and education of children, especially the girl child. The next dimension measures deprivation in *individual-level capabilities* using physical health and food security commonly used in the literature (Chzhen and Ferrone 2016; Victor et al. 2014). The third dimension measures psychosocial well-being and social network/capital. Our data allows us to include an uncommon indicator: a modified Acholi Psychosocial Assessment Instrument (APAI), which measures subjective well-being. The APAI is used to assess deprivation in mental health, specifically, the incidence of depression (*two tam, par*, and *kumu*), anxiety (*ma hwor*), and conduct problems (*kwo maraco*) (Green et al. 2016). Given the centrality of the spirit world in Uganda's conflict, understanding the role of depression-like symptoms is both novel and policy-relevant. The extent of (dis)empowerment in social network/capital by exploring whether or not individuals received material or real help from neighbors/friends, as well as the number of groups they belonged to. We consider an individual deprived if they received no help and belonged to no group. Beneficiaries that belonged to a savings group at baseline were assumed to be non-deprived. Appendix 2 presents the summary statistics of the data used for our analysis.

We measured *household material well-being* at the household-level. An individual is considered disempowered if they live in a house made from semi-permanent building materials (roof, wall, and floor), with no electricity, and unshared flush/pit latrine. Individuals in households that walk more than 20 minutes to access safe drinking water are considered deprived. While this cut-off is a departure from the literature which uses 30 minutes, our choice of cut-off reflects the fact that walking 20 minutes and above to access water is due to data constraints. For the *economic empowerment* dimension, individuals are disempowered if they lack ownership of at least one of mobile phone, radio, brewing machine, a bicycle, or stove, and earn monthly income below the mean of Phase 1 sample at baseline. In the forthcoming analysis, for the ease of presentation, we will use the acronym WEI (WINGS Empowerment Index) to represent $M0$ – the product of Headcount (H) and intensity (A).

Table 1: WINGS Empowerment Index (WEI): Deprivations, Indicators, Cut-offs, and Weights

Dimension	Indicator	Survey question(s)	Deprivation Cutoff	Weights	
Empowerment (Household Decision-making & Gender Norm) $w_d = 1/5$	Control over household resources and decision-making	a) When you have small amounts of money, such as 500 to 2,000 shillings, can you decide how to spend it on your own?	...if no control over earned income and household expenditure decisions	1/10	
		b) If a wife has earned some money, does she have the right to buy clothing for herself or her children without asking the permission of her husband?			
	Gender norm	c) When an expensive item like a bicycle or a cow is to be purchased by the household, is your opinion listened to in the decision of what to buy?			
		d) Do you agree that a wife has a right to buy and sell things in the market without asking the permission of her husband?	...if no freedom to participate in economic activities	1/10	
Individual-Level Capabilities $w_d = 1/5$	Food security	a) Less than 2 meals per day	... < 2 meals per day	1/10	
	Physical Health Index, z-score	b) Standardized index of days ill, a subjective “overall” health question, and three activities of daily living (walking a distance, carrying a heavy load, and working on a farm)	...If z-score < the median of the distribution at baseline	1/10	
Psychosocial well-being and social network $w_d = 1/5$	APAI	a) The Acholi Psychosocial Assessment Instrument (APAI) depression subscale, a 35-item instrument developed in Northern Uganda (Bolton et al. 2007).	...if APA-R cut-off score >0.91 on the 0-3 scale (Green et al., 2016)	1/10	
		b) How often do you receive practical help from your friends and neighbors, such as help looking after your children, helping you when you are sick or helping with garden work?	...does not receive practical and material help from friends/neighbors, or does not belong to any group	1/10	
	Social capital	a) How often do you receive material help from your friends or neighbors, such as cash loans, clothes, or supplies you need?			
		b) Member of a savings group			

			c) Number of groups respondent belongs to			
Household Material Well-being	Condition dwelling	of	a) What is the main type of material is used for the roof of the dwelling where you sleep? b) What is the main type of material used for the walls of the dwelling where you sleep? c) What is the main type of material used for the floor of the dwelling where you sleep?	...if living in a house with at least roof, wall, or floor constructed with a semi-permanent material.	1/10	$w_d = 1/5$
	Access to Public Services (Electricity, Water, and Sanitation)		a) What is your household's main source of fuel for energy for lighting? b) What type of toilet facilities does your household usually use? c) How many minutes does it take you to walk from your household to the nearest source of drinking water?	...if no access to electricity, flush/pit latrine (private and unshared), or access to safe drinking water takes more than 20 minutes' walk	1/10	
Economic Empowerment	Assets (Productive assets & household articles)		How many of each of the following items do you and your household own? a) Sets of brewing equipment; Radio; Bicycles; Stoves (expensive)	...not having at least one of phone, radio, brewing machine, bicycle, or stove	1/10	$w_d = 1/5$
	Material income		a) About how much cash did he/she earn in total in the past 7 days?	...If daily income is less than 1\$/day (i.e. 855UGX/day PPP adjusted and deflated for endline)	1/10	

Source: Authors with information from WINGS Phase 1 Survey Instruments derived from Harvard Dataverse (Annan et al. 2017).

Notes:

1. The applicable survey questions for our computation are the following: Empowerment (Household Decision Making: 1, 13, 6, 14, 12); Individual-level capabilities (34; and 24-44); Psychological well-being and Social network (58-88; and relationship with neighbors: 91, 92, 10, 1-37; and social capital: 10, 1-37). The psychological well-being, APAI, is a one-dimensional measure of depression, but the scale items represent three local depression problems – *par*, *two tam*, and *kumu*. The instrument was developed for by Bolton et al. (2007). Household material well-being (household resources: 4,5,6,7,8); Economic empowerment (Assets: 47, 50, 52, 87, 86; and Economic Activities: 93).

2. Cutoffs were set at below 2 standard deviations below for standardized *z-scores* z-score such as the physical health index used by Blattman et al. (2016). The measure of weekly income was top-censored at the 99th percentile to contain outliers. WEI status is defined as 1 if below the

empowerment cut-off, and 0 otherwise.

V. Estimation Results

This section presents the WEI profile for program beneficiaries. It analyzes the overall impact of the WINGS program on ultra-poverty among beneficiaries, including an assessment of its effectiveness in reducing the incidence and severity (i.e., average number of disempowerments) of poverty among conflict-affected women. The program impact on the treated group vis-à-vis the control is examined at different poverty thresholds (k) using a double-difference method. The robustness of our results is tested using alternative regression specifications.

A. Levels and Changes in Multidimensional Poverty at Baseline and Endline

Table 2a and 2b below shows the extent of multidimensional poverty among program beneficiaries in the WINGS program at both baseline and endline. It shows the incidence of poverty, H , the intensity or breadth of poverty, A , and the AF adjusted headcount ratio, M_0 , which indicates the overall poverty.

Table 2a: Multidimensional Measures of Poverty at Baseline

Year	Number of Observations		Headcount Ratio (H)		Average Share of Deprivations (A)			M_0 Indicator = $H \times A$			
(a)	(b)		(c)		(d)			(e)			
N	Control	Treated	Control	Treated	Control	Treated	Diff.	Control	Treated	Diff.	
k=30	1785	896	889	1.000	0.998	0.664	0.674	-0.010	0.664	0.673	-0.009
k=40	1785	896	889	0.994	0.994	0.666	0.675	-0.010	0.662	0.672	-0.009
k=50	1785	896	889	0.969	0.957	0.673	0.686	-0.013	0.652	0.657	-0.005
k=60	1785	896	889	0.845	0.870	0.698	0.705	-0.007	0.590	0.613	-0.023
k=70	1785	896	889	0.592	0.618	0.748	0.748	0.000	0.438	0.462	-0.024
k=80	1785	896	889	0.213	0.251	0.812	0.817	-0.006	0.173	0.205	-0.032
k=90	1785	896	889	0.023	0.042	0.905	0.903	0.002	0.021	0.038	-0.016

Note: Standard errors are not presented here, but are shown in the graphs in the form of 95% Confidence Interval (CI).

Table 2b: Multidimensional Measures of Poverty at Endline

Year	Number of Observations		Headcount Ratio (H)		Average Share of Deprivations (A)			M_0 Indicator = $H \times A$			
(a)	(b)		(c)		(d)			(e)			
N	Control	Treated	Control	Treated	Control	Treated	Diff.	Control	Treated	Diff.	
k=30	1688	872	860	0.997	0.999	0.527	0.484	0.043	0.525	0.483	0.042
k=40	1688	872	860	0.917	0.873	0.547	0.510	0.036	0.501	0.446	0.056
k=50	1688	872	860	0.703	0.576	0.591	0.567	0.024	0.416	0.327	0.089
k=60	1688	872	860	0.405	0.269	0.658	0.644	0.014	0.267	0.173	0.093
k=70	1688	872	860	0.178	0.092	0.733	0.729	0.004	0.130	0.067	0.063
k=80	1688	872	860	0.046	0.026	0.828	0.805	0.023	0.038	0.021	0.017
k=90	1688	872	860	0.011	0.001	0.910	0.900	0.010	0.010	0.001	0.009

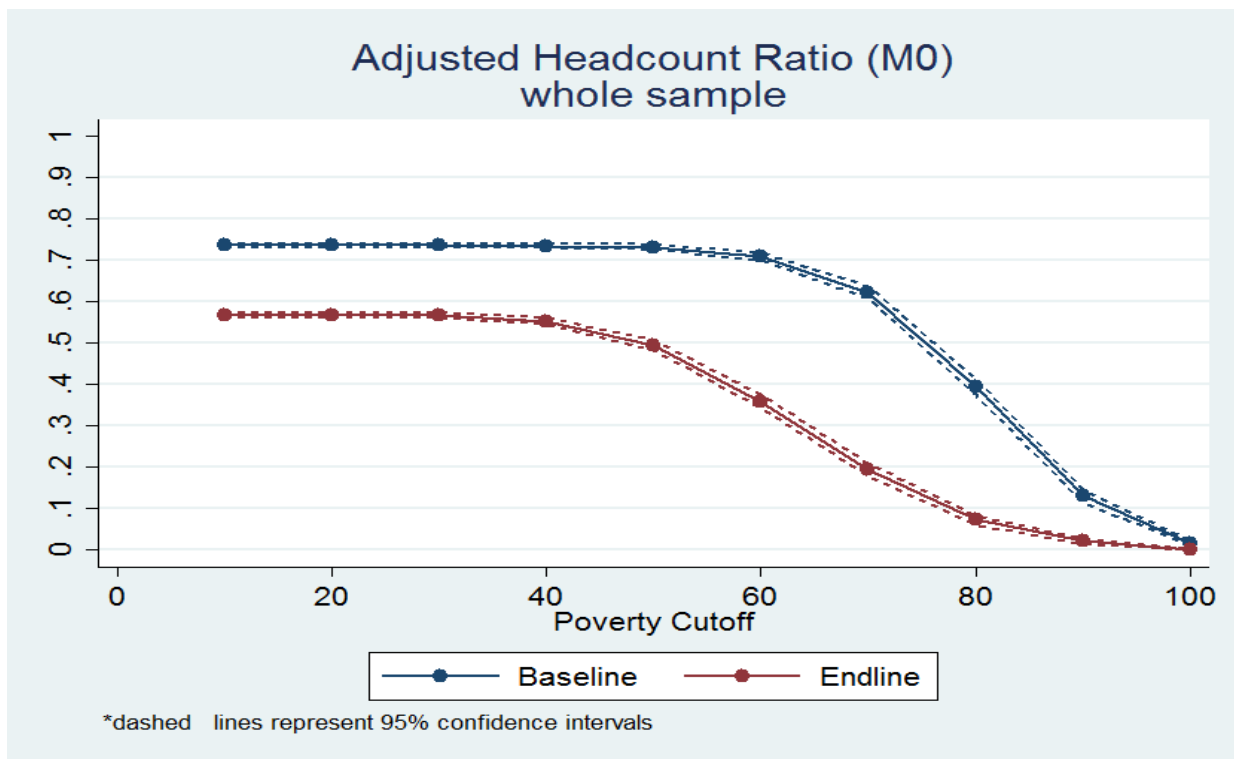
Note: Standard errors are not presented here, but are shown in the graphs in the form of 95% Confidence Interval (CI).

Column (a) in the tables above indicate the number of disempowerments faced by WINGS beneficiaries (N) at different poverty cut-off values. Column (b) shows the number of participants in treatment and control group at each period, while the proportion of individuals identified as multidimensionally poor are represented by H (Column c). Column (d) highlights the number of individuals that are both poor and disempowered, while the Column (e) indicates the overall multidimensional poverty measure. In general, the intensity of poverty declines as the poverty cut-off increases, since the number of individuals deprived in all dimensions progressively decline.

At a poverty cut-off of 30% (i.e., disempowered in 3 of 10 dimensions), nearly all WINGS beneficiaries were identified as poor at baseline. However, the intensity of poverty (A) was slightly higher relative to the control group. While this difference is not significant, it means that the impact of the WINGS program is more likely to be understated than the converse (Blattman et al. 2016). Table 3b shows that all the individuals in the treated group at endline outperformed those in the control group across all measures of the WEI.

Figures 2a and 2b below presents the changes in the multidimensional poverty measure indicated by the adjusted headcount ratio (M_0). The M_0 is a product of the headcount ratio and intensity, and thus takes into account how many people are considered disempowered as well as their accumulated number of deprivations.

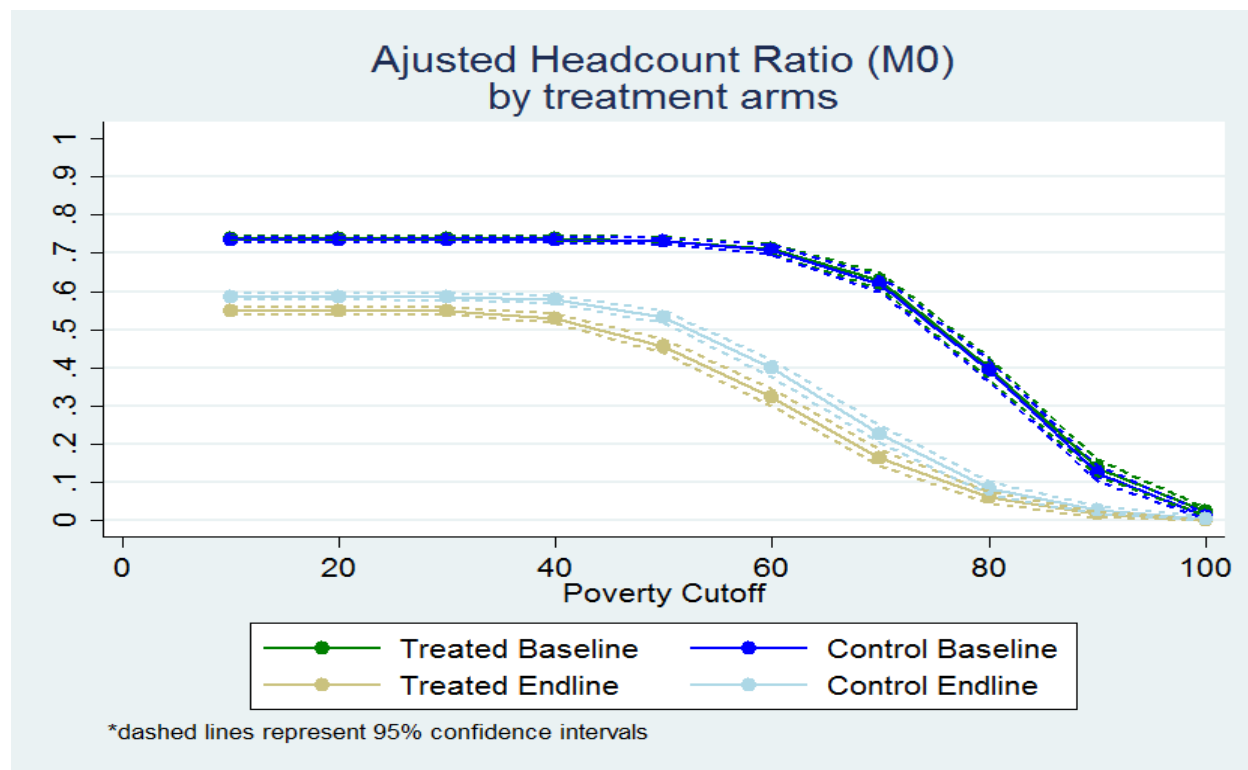
Figure 2a: Adjusted headcount ratio (M_0), at different k-values



Source: Authors' own calculations

Note: At $k=50$ per cent, an individual is deprived in any 5 out of 10 dimensions of the WEI

Figure 3b: Adjusted headcount ratio (M_0) by treatment arms, at different k-values



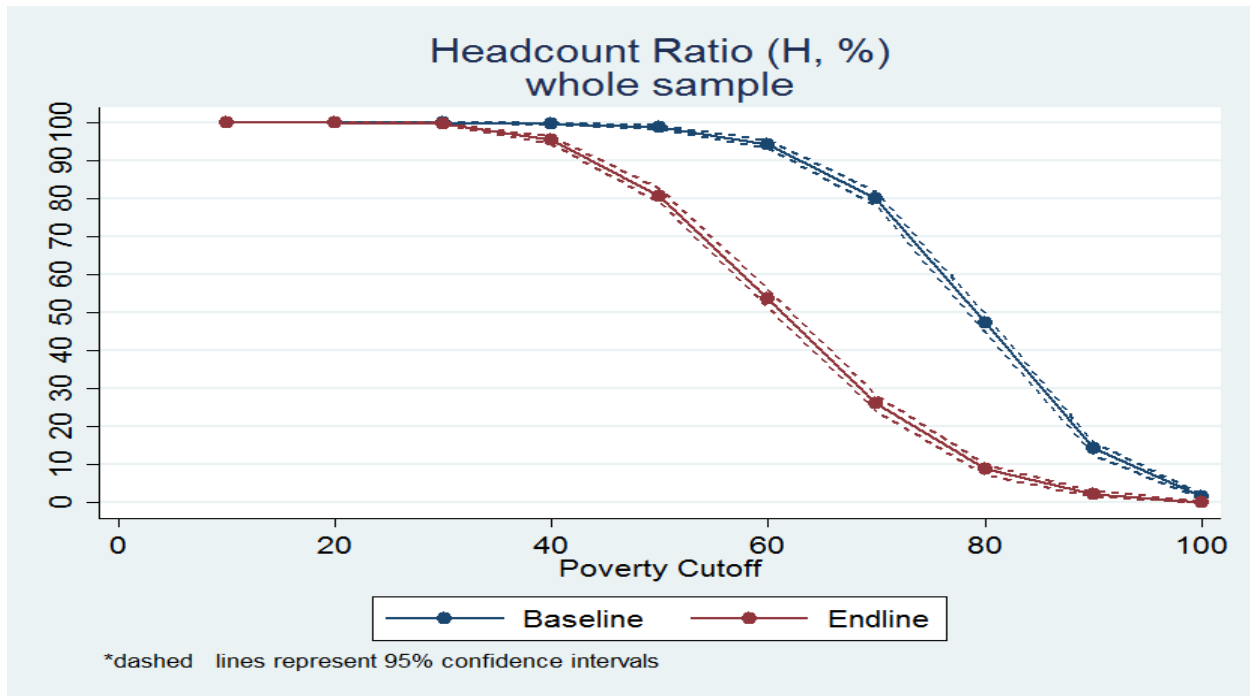
Source: Authors' own calculations

We find that the adjusted headcount ratio for the whole sample declined by 0.109 points from 0.645 points at baseline to 0.535 points at endline. This entails that all conflict-affected women were better off at endline, possibly due to macroeconomic factors, GoU's PRDP policies, or recovery of livelihoods from the violent conflict. However, a further examination of the adjusted headcount ratio by treatment arm (figure 2b) reveals that the treatment group recorded a statistically significant reduction relative to the control group all cutoff levels. The advantage of the adjusted headcount ratio (M_0) over the headcount ratio (H) is that it makes explicit the reduction in the severity of the deprivations (i.e. the number of joint deprivations) as well as the number of people who are considered WEI poor.

With regard to the incidence of poverty, or poverty headcount (H), we find that on average, conflict-affected women who were disempowered declined for the entire WINGS Phase 1 sample. As shown in figures 3a and 3b below, the decline was more pronounced when the poverty threshold was between 20 and 80 per cent. However, at lower cutoff levels (i.e., *union approach*) nearly every woman in the sample remained poor, while at very high cutoff points (i.e., *intersection approach*), nearly all the sample are non-poor. Disaggregating the incidence of poverty by treatment arm reveals that although both groups experienced lower levels of disempowerment at endline, the reduction in

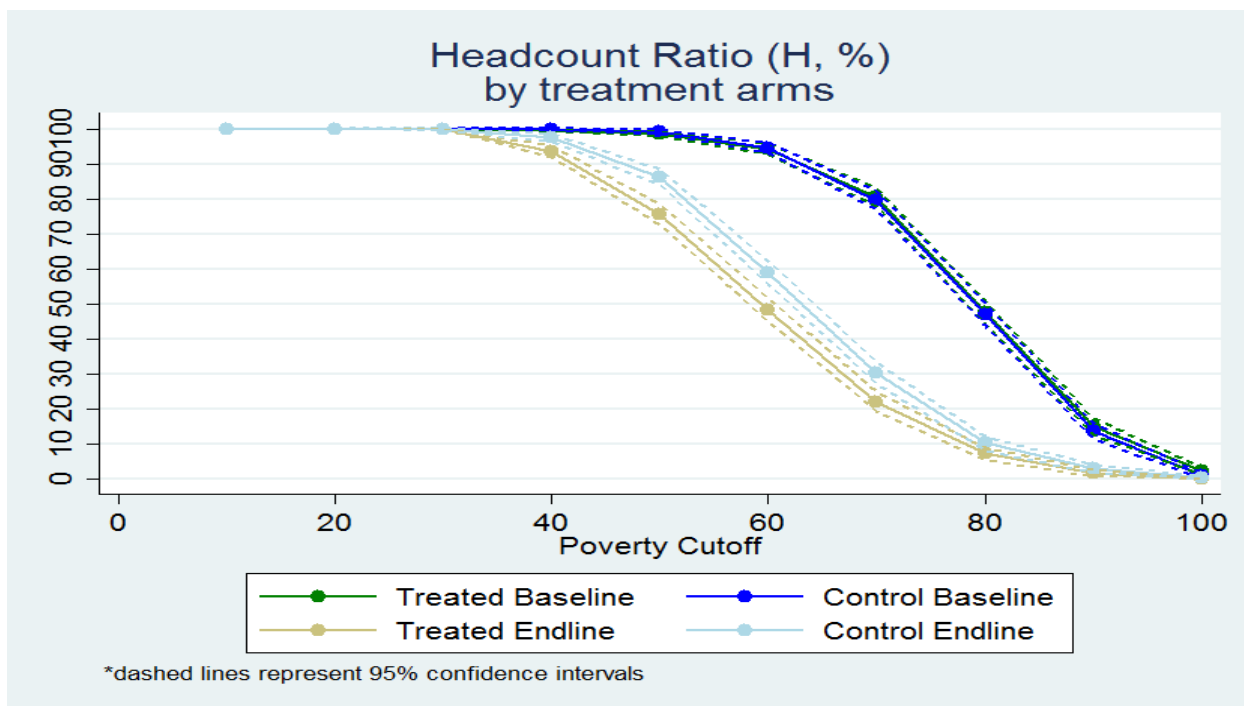
poverty headcount ratio was faster and statistically significant among the treated group. Comparing the incidence to the adjusted headcount ratio reveals that while all women in the sample are poor at low cut-off levels, they suffer from a lower number of joint deprivations (i.e. a reduction in the intensity) at endline.

Figure 3a: Headcount ratio (H), at different k-values



Source: Authors' own calculations

Figure 3b: Headcount Ratio (H) by treatment arms (at different k-values)



Source: Authors' own calculations

B. Regression Results

Table 4 below reports the results for the estimated DID at various poverty cut-offs (k -values). The results suggest that WINGS did not reduce the incidence of poverty (H), but reduced the intensity of deprivations faced by individuals with different values of k . Specifically, we find that the program was effective in reducing extreme poverty when the cut-off is between 40% 100%. We find that all the women in the sample, treated and untreated, have had a reduction in their joint deprivations overtime. The poorest of the poor, at high k -values, except at 80% and 90%, are less likely to be as poor at endline than they were at baseline. For this reason, the difference in differences approach shows the impact of the program on the joint deprivations of the treated women away from the counterfactual reduction, that is of the control group.

We find that treated individuals are 4% less likely to be deprived in 40% or more of the indicators of WEI, 11% less likely at the 50% cutoff, 11% at the 60% cutoff, and 8%, and 2% at 70, and 100%, respectively. This impact is statistically significant at cutoff levels between 40 to 100%. The effect of the program peaks for beneficiaries within the group who experience 50% and 60% deprivations. At higher cut-off points such as 80%, 90%, and 100% which represents the intersection approach at which an individual needs to be deprived in *each* indicator to be considered poor, poverty headcount at such high k -values approach zero. When taking the union approach (i.e. $k=0$, anyone who experiences at least 1 deprivation is considered disempowered), the program is not effective. Indeed, at k -values less than 30 per cent, we find no variations in the multidimensional disempowerment status of conflict-affected women since the WEI headcount is nearly 100% for all women in the sample, suggesting that even at endline women experienced at least 3 simultaneous deprivations.

Table 4 - Regression Results – Difference in Difference using Pooled Data

Multidimensional Disempowerment Status using Different Poverty Cut-Offs								
	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(%)	$k=30$	$k=40$	$k=50$	$k=60$	$k=70$	$k=80$	$k=90$	$k=100$
Endline	-0.00	-0.02***	-0.13***	-0.35***	-0.49***	-0.37***	-0.11*	-0.01*
	(0.00)	(0.01)	(0.02)	(0.03)	(0.03)	(0.03)	(0.02)	(0.00)
Treated	-0.00	-0.00	-0.01	-0.00	0.01	0.00	0.02	0.01*
	(0.00)	(0.00)	(0.01)	(0.01)	(0.03)	(0.03)	(0.02)	(0.01)
Endline x Treated	0.00	-0.04**	-0.11***	-0.11***	-0.08**	-0.03	-0.03	-0.02**
	(0.00)	(0.01)	(0.03)	(0.04)	(0.04)	(0.04)	(0.02)	(0.01)
Constant	1.00***	0.99***	0.96***	0.86***	0.76***	0.49***	0.11***	0.02**
	(0.00)	(0.02)	(0.03)	(0.04)	(0.05)	(0.05)	(0.03)	(0.01)
N	3361	3361	3361	3361	3361	3361	3361	3361
R ²	0.004	0.032	0.116	0.227	0.293	0.189	0.051	0.010

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Controls included in the regressions are age, gender, household size, partner, only income earner, number of biological children, and ethnicity; $k=0$ and $k=100$ represent the union and intersectional approach to poverty measurement, respectively.

It is important to note that our methodological approach examines the joint deprivations of WINGS beneficiaries, and therefore places a rather stringent requirement on the ability of the WINGS intervention to reduce poverty. Thus, while it can be claimed that these conflict-affected women should not experience any of these deprivations at once, especially in the spirit of the sustainable development goals and leaving no one behind, it is important to acknowledge that the intervention reduced the severity of poverty (i.e., the average number of deprivations), as shown in Table 5. To test the robustness of our results, we conducted additional regressions using the following alternative specifications: DID using first differencing; controlling for individual fixed-effects; and using deprivation score as an outcome variable. These estimations yield results (see Appendix 3 and 4) similar to the original DID estimation reported above.

Furthermore, we conduct the analysis using the uncensored deprivation score (that is the raw number of weighted deprivations that a person experiences at once) in order to examine the average effect of the treatment on the severity of disempowerment. We run the regressions using the same control variables as in Table 4, and using a pooled OLS, First Differencing, and Fixed Effects methodology. The results are presented in Table 5. We find that the intervention, on average, reduces the joint deprivations of conflict-affected women. Specifically, we find that being treated with the WINGS approach reduces the deprivation score by 0.05 points. Considering the weighting structure of WEI, each individual deprivation increases the deprivation score by 0.1 point. Therefore, the effect is a reduction in half a deprivation. Obviously, the effect would be magnified if we considered the poorest of the poor as these generally observe a higher reduction from baseline when treated.

Table 5 - Regression Results using Deprivation Score as an Outcome Variable

	(1) Deprivation Score	(2) Δ Deprivation Score	(3) FE using Deprivation Score
Endline	-0.15*** (0.01)		0.00 (.)
Treated	0.00 (0.01)	-0.04*** (0.01)	
Endline x Treated	-0.04*** (0.01)		-0.04*** (0.01)
Constant	0.72*** (0.01)	-0.20*** (0.03)	-0.15*** (0.01)
N	3361	1674	1717
R ²	0.326	0.038	0.012

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Controls included in the regressions are age, gender, household size, partner, only income earning, number of biological children, and ethnicity

D. Isolating the Effect of Group Training versus Cash Transfer

In addition to receiving an unconditional cash transfer, some WINGS program participants were randomly assigned to receive group dynamics training (see Research Design in Appendix 1). This sub-component of WINGS encouraged the formation of self-help groups such as ROSCAs, social interaction, as well as labor-sharing, risk-pooling, and product marketing (Blattman et al. 2016). The table below shows that both cash transfer and group training was effective in empowering conflict-affected women by reducing the joint deprivations of the treated individuals (as shown in first row; the uncensored deprivation score – 0.526). However, the difference between treatment with (A) and without (B) the group training is not statistically significant. Apart from the reduction of poverty status among those who experienced at least 60% of the joint deprivations, there is no evidence to suggest that the group training had a statistically significant effect on women’s multidimensional empowerment relative to the unconditional cash transfers.

Table 6 - The Impact of the Group Training on Women Empowerment

Variable		Control Mean	No Group Training (A)	Group Training (B)	Difference (A)-(B)	No. of Obs.
Deprivation Score		0.526	-0.042 (.012)***	-0.037 (.022)*	-0.005 (.013)	1655
Multidimensional WEI at cut-off values	30	0.998	.001 (.001)	.001 (.001)	-0.001 (.001)	1655
	40	0.974	-0.041 (.016)***	-0.021 (.030)	-0.02 (.018)	1655
	50	0.861	-0.112 (.029)***	-0.078 (.056)	-0.033 (.035)	1655

60	0.589	-0.115 (.038)***	-.094 (.071)	.021 (.042)	1655
70	0.303	-.102 (.034)***	-.124 (.062)**	-.022 (.037)	1655
80	0.102	-.038 (0.23)*	-.05 (.041)	.011 (.022)	1655
90	0.03	-.007 (.010)*	-.005 (.018)	.012 (.009)	1655
100	0.005	-.006 (.002)**	-.008 (.004)*	0.003 (.002)	1655

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: at cutoff values < 30 , the headcount is near 100%, i.e. no variation in the outcome variable. All treated program beneficiaries received a cash transfer, but not all received group training. This table follows the same procedure and methodology as Blattman et al. (2016).

D. Censored Headcount Ratios of WEI Indicators

The AF method utilizes the censored deprivation scores to compute the multidimensional measures of poverty (M_0, H, A), and also allows us to measure the percentage contribution of each dimension of poverty in table 2¹⁶, as well as the censored headcount ratio of each indicator (that is deprived in specific indicator and disempowered overall). In this section, we compare the censored headcount ratios of each indicator (dimension of deprivation), which reflects the proportion of people that are both disempowered and deprived in an indicator.

By design, the censored headcount ratio decreases as poverty cut-off increases, however, at a poverty cut-off of 0, the censored headcount ratio is the same as the raw uncensored poverty headcount ratios. In the graphs below, we show the difference in censored headcount ratios (starting from the uncensored ratios at $k=0$, the union approach till $k=100$, the intersection approach) over time between the endline and the baseline and among the different treatment arms.

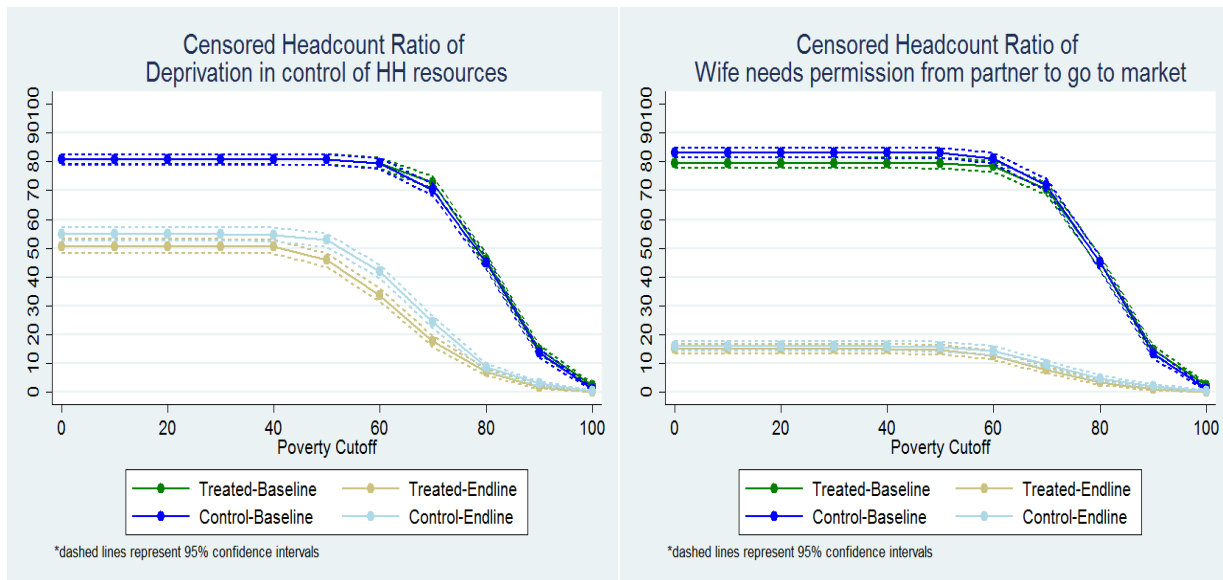
The results suggest that at baseline, program participants were mainly deprived in access to quality public services (electricity, water, and sanitation), poor household living conditions (roof, wall, and floor), and social networks/capital. This is followed by women's disempowerment in household decision-making, comprising of participation in expenditure decisions and the gender norm of requiring spousal approval to participate in economic activities. Expectedly, program participants were deprived in both monthly earned income as well as economic and household assets. The censored headcount ratio of deprivation in psychosocial well-being reveals that the

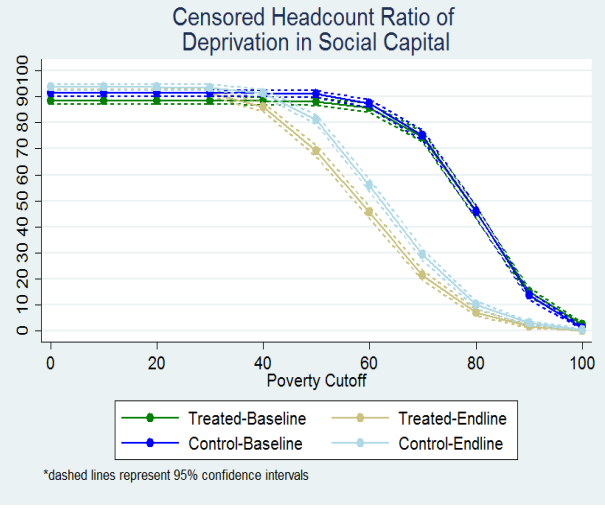
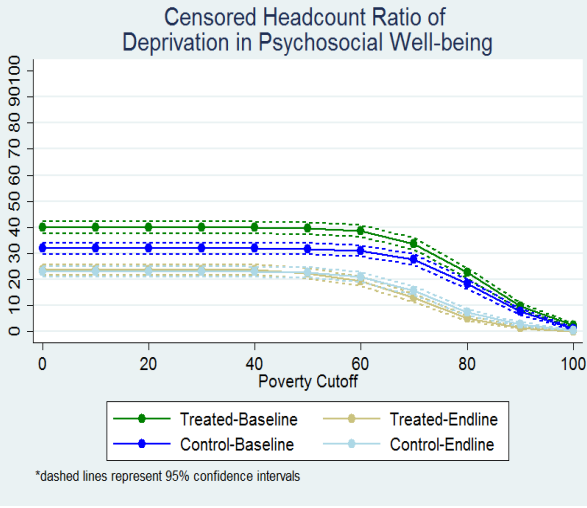
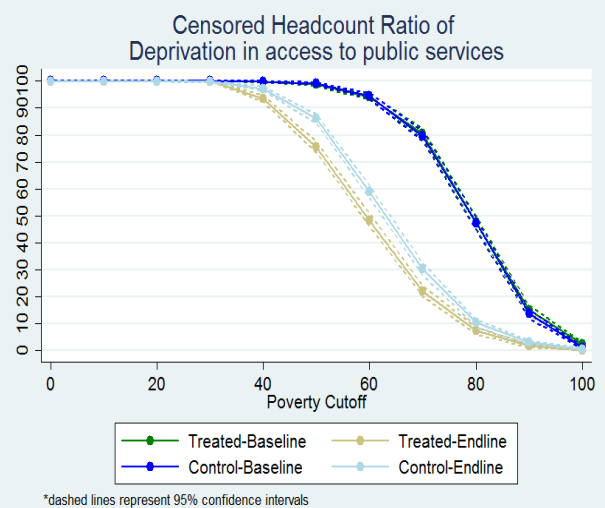
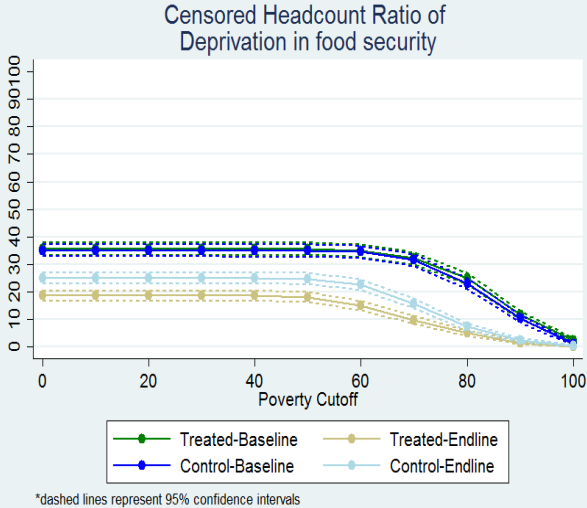
¹⁶ While information about the percentage contribution of each indicator to overall disempowerment is useful at each cross-sectional level, it cannot be compared overtime since the denominator and the numerator change simultaneously. Percentage contribution_d equals: (censored headcount_d x weight_d)/ M_0 where d is the indicator. Results of the analysis are available on requests.

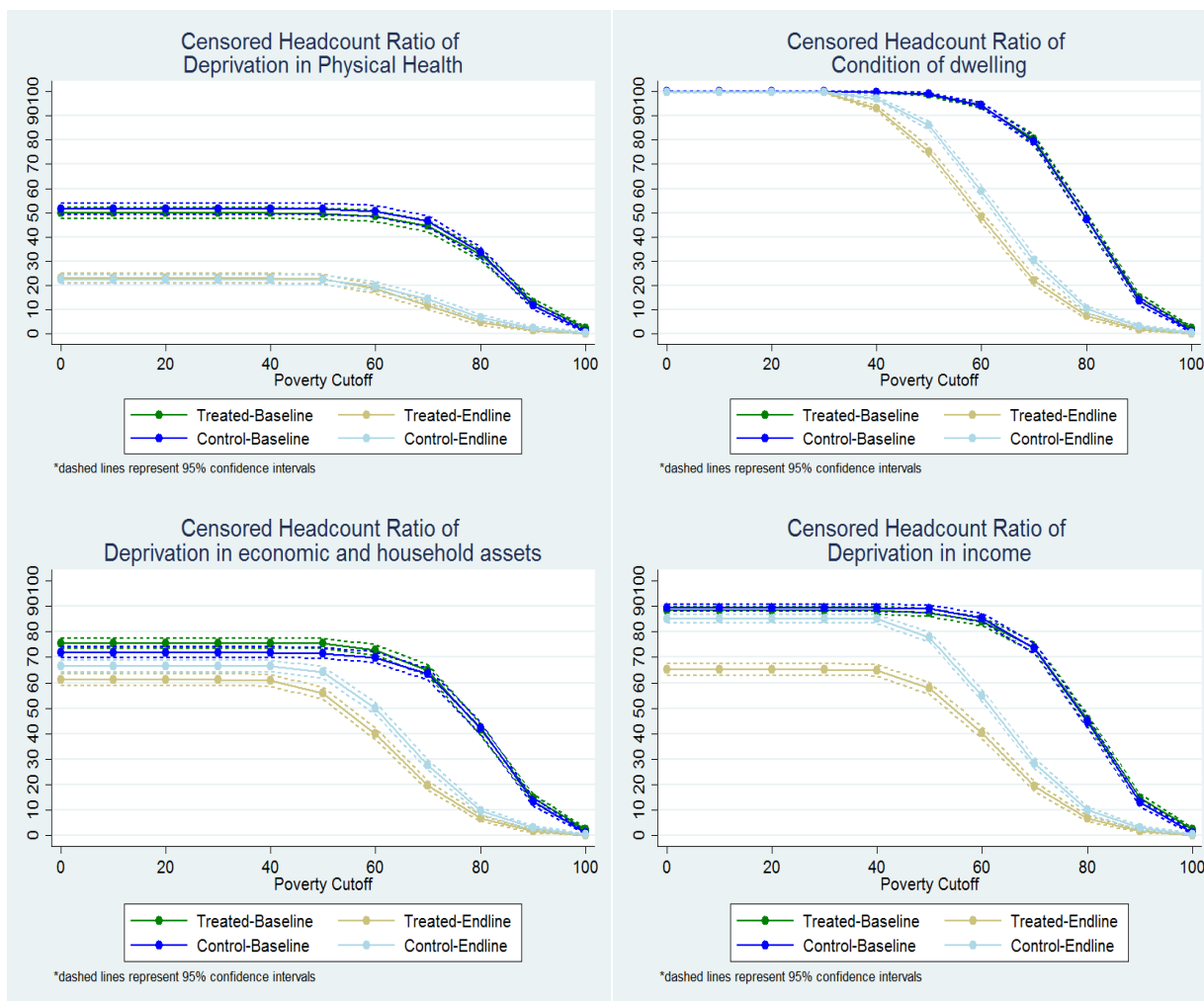
treated group was more deprived relative to the control group. However, there is no statistically significant difference at endline. Given that at endline both groups have lower levels of psychological ill-being, this suggests that the treated group had a larger improvement in their psychological well-being relative to the control group. On average, we observe that conflict-affected women were physically healthy at baseline, while most were deprived in income as well as economic and household assets. It is important to note that these comparisons are differences in unconditional means, and therefore hinge on the quality of the randomization of WINGS.

Analyzing the censored headcount ratios by treatment arms (control and treated groups) reveals that the extent of deprivation among program beneficiaries declined across all WEI indicators, especially at cut-offs above 40 per cent. That is, the program was effective in reducing some of these deprivations when the participant suffered from 4 or more simultaneous deprivations. It also shows that the fall was faster and statistically significant among treated groups in indicators such as income, asset ownership, social capital, and living conditions. Despite the decline in the dimensions of disempowerment, it is important to point out that the average number of joint deprivations suffered by program participants remained high, post-treatment, especially at lower cutoff levels. Since our analysis was limited to Phase 1 of the WINGS program, one can plausibly presume that further improvements in key outcomes were instigated at the Phase II's endline.

Figure 4: Censored Headcount Ratio of WEI indicators







Source: Authors' own calculations.

E. Discussion

The results of this analysis show that the intervention was successful at reducing the amount of overlapping deprivations that women in this conflict-affected setting experienced. However, this reduction was not sufficient to take them out of the poverty or disempowerment. At endline, we find that *all* the women in the sample experienced three or more deprivations simultaneously. We find evidence that at higher cut-off levels, i.e. those who have more than 60% of the joint deprivations – the poorest of the poor –, the intervention was effective at taking them out of multidimensional poverty.

When examining the different elements of the intervention, we find that it was in fact the cash transfer of 150 USD that had the major impact on the reducing the overlapping deprivations, but not the group training element. Admittedly, this study only concerned itself with Phase I of the intervention when the randomization is clear-cut and a control group is evident. We cannot, therefore, rule out that Phase II of the intervention had further improvement on the women's wellbeing.

By analyzing the censored headcount ratios of the deprivations, i.e. the percentage of women deprived in a certain indicator and also has a cumulative deprivation score above the cut-off k , we

find that the intervention was successful at reducing food insecurity, income and assets deprivation, and increased control of these women over household resources. We only find strong evidence (that is, statistically significant) of improvement of the censored headcounts of deprivations in conditions of dwelling, access to public services, and social capital at high levels of poverty cut-off (k), suggesting that it the intervention had a more immediate impact on these indicators when women experienced many joint deprivations at once. In terms of physical and psychological health, our results are inconclusive. Physical health deprivation was very low at baseline and endline, and the different between the control and treated groups is not statistically significant. Interestingly, the two groups differed at baseline in terms of psychological ill-being – where the treated group had a higher headcount of psychological ill-being. The two groups experienced a reduction in this deprivation but the difference between the groups is not statistically significant at endline, suggesting a faster improvement in psychological distress among the treated group than that of the control group.

Blattman. et al (2016) find that the intervention had strong positive effects on most of the outcomes they have used. It is important to distinguish here the difference in our approach and theirs. While using a continuous variable introduces a lot of variation in the outcome of interest, the positive impact that one finds is certainly a good indication that the program was effective. However, two important pieces of information would be missed: 1) is the improvement sufficient for the subject to be non-deprived in that outcome – using theoretically sound and internationally agreed-upon definitions of deprivations?, and 2) has the improvement been witnessed along all the intended outcomes of the program for the same person at the same time? Admittedly, this is a taxing requirement on any intervention. However, in order to eliminate poverty in all its forms and dimensions (as per the first goal of the Sustainable Development Goals), and to achieve multi-sectoral policies and interlinkages across policy actions, it is an essential requirement. Furthermore, Blattman et al. (2016) carried out a cost-benefit analysis in order to assess the feasibility of the intervention. The difficulty in carrying out this analysis in our approach is that many of these deprivations cannot be priced, per se. Therefore, we only conduct an analysis on the effectiveness of the program in reducing the overlapping deprivations and not carry out a feasibility study.

Given the findings and the evidence, the central question becomes: What can be learned from this intervention, and what can be recommended in fighting poverty in all its dimensions, along the lines of the Sustainable Development Goals? What are the policy implications of our findings? And to what extent can we generalize the results of this intervention to other contexts and settings? Evidently, the intervention has had its merits in reducing the severity of poverty and disempowerment among its target women. However, in order to leave no one behind and alleviate all the deprivations that are relevant for sustainable development, policies need to ensured they are multi-sectoral and cut across all the relevant deprivations that poor people experience. That said, the setting in which this intervention took place is among the poorest in the world and particular to conflict-affected settings, and therefore the effect may be magnified as the baseline is such low (Blattman et al., 2016). On the one hand, many corners of the globe are affected by similar conflicts and a lot can be learned from this study in order to improve affected people’s lives. On the other hand, replications of this study inside and outside conflict settings are crucial in order to ensure its generalizability.

VI. Conclusion

This paper examined multidimensional poverty among conflict-affected and extremely poor women in two of the most war-affected districts in Northern Uganda (*Kitgum* and *Gulu*). We combined the AF adjusted headcount ratio, whose identification of the poor is based on a counting approach, and a double difference to conduct a multidimensional impact evaluation of the WINGS program which aimed at empowering women economically as well as socially. To capture the multiple deprivations of program beneficiaries, who were predominantly young women aged 14-35, we developed five domains of deprivation, namely: participation in household decision-making and economic activities (without spousal approval); individual-level human capabilities; psychosocial wellbeing and social network/capital; household material well-being; and economic empowerment.

We find that the WINGS program reduced the average number of deprivations faced by program participants by 4%, however, this effect was more pronounced among those that were relatively poorer. For instance, our results show that multidimensional poverty among those that experienced five of ten deprivations declined by 11%, while it declined by 8% for program beneficiaries that suffered seven deprivations simultaneously. Apart from raising the income of conflict-affected women, it empowered them to participate in both economic activities and household decision-making. These findings support the perspective that empowering women entrepreneurship improves their ability to participate in household-decision making.

While the unconditional cash transfer and group dynamics training effectively reduced the joint deprivations of treated program beneficiaries, there is no evidence to suggest that the group encouragement had a statistically significant effect on women's disempowerment status relative to the unconditional cash transfers (see table 6). A decomposition of the multidimensional measures reveal that poverty was largely driven by the exclusion from public services, specifically access to electricity, sanitation, and the distance to fetching safe drinking water, as well as poor living conditions. Given that Gulu and Kitgum in Northern Uganda are poorer than other districts and regions in Uganda, our findings that poverty is largely driven by lack of public service delivery highlights the incapacity, or failure, of the GoU to provide welfare improving public services to the population.

These findings are relevant to both policymakers and researchers in many respects. They show that improving public service delivery is central to fighting both poverty and empowering women, especially in conflict-affected environments. Thus, focusing on bridging service entitlement failures in post-conflict and fragile states will be key to reducing extreme poverty as envisioned in the SDGS. With growing evidence that extremely poor people face several deprivations at once, the design of poverty reduction programs and their evaluation should go beyond the traditional impact evaluation method of targeting single outcome variables.

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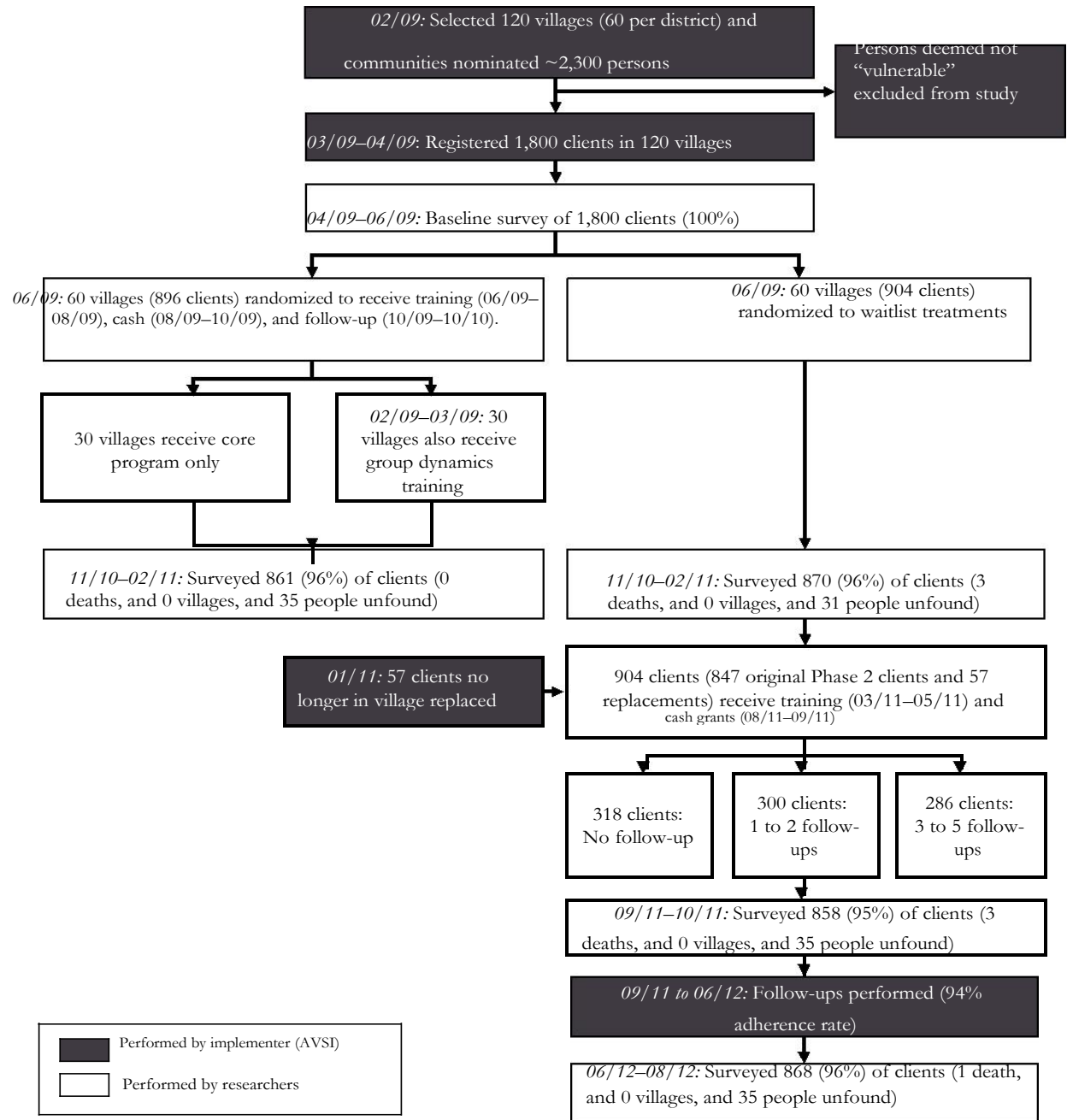
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Appendices

Appendix 1: Study Sample and Experimental Design



Source: Blattman et al. (2016, figure 1)

Appendix 2: Descriptive Statistics

WINGS Program (Phase 1)												
Variables	Obs.	Baseline (2009)					Endline (2011)					
		Control		Treated			Control			Treated		
		M	SD	Obs.	M	SD.	Obs.	M	SD.	Obs.	M	SD.
age		27.631	7.332		27.011	7.220	-	-	-	-	-	-
female/gender	902	0.864	0.343	896	0.859	0.348	872	0.862	0.345	860	0.856	0.351
decidemoney	901	0.794	0.405	892	0.800	0.400	872	1.972	1.208	859	1.953	1.195
wifeclothing	884	0.244	0.430	875	0.250	0.433	871	2.966	0.806	859	3.002	0.766
payexpensive	902	0.889	0.314	890	0.861	0.346	858	1.541	0.821	858	1.449	0.772
wifemarket	895	2.079	0.618	887	2.112	0.662	869	3.129	0.759	857	3.153	0.726
lessthan2meals	904	0.644	0.479	896	0.643	0.479	872	1.763	0.469	860	1.821	0.401
healthindex	904	-0.045	0.943	896	-0.061	0.982	873	0.002	0.985	861	-	1.020
											0.010	
APAI_Ravg	902	0.750	0.532	894	0.848	0.564	872	0.585	0.507	860	0.601	0.501
roofqual	904	0.000	0.000	896	0.002	0.047	873	0.005	0.068	861	0.008	0.090
wallqual	904	0.002	0.047	896	0.007	0.082	873	0.002	0.048	861	0.006	0.076
floorqual	904	0.000	0.000	896	0.001	0.033	873	0.003	0.059	861	0.003	0.059
electricity	904	0.000	0.000	896	0.000	0.000	873	0.001	0.034	861	0.002	0.048
latrinequal	904	0.185	0.388	896	0.191	0.393	873	0.372	0.484	861	0.380	0.486
minwalkwater	904	0.987	1.244	896	1.041	1.250	873	1.573	1.335	861	1.770	1.310
hrbrew	904	0.200	0.611	896	0.170	0.539	873	0.351	0.816	861	0.337	0.827
hrradio	904	0.154	0.361	896	0.116	0.320	873	0.307	0.462	861	0.359	0.480
hrbike	904	0.225	0.418	896	0.177	0.382	873	0.387	0.513	861	0.469	0.546
hrphone	904	0.028	0.164	896	0.019	0.137	873	0.145	0.353	861	0.220	0.414
hrstovee	904	0.025	0.158	896	0.046	0.209	873	0.036	0.185	861	0.070	0.255
Cashtotal7d	904	9420	13805	896	8642	13645	872	24608	47129	858	63646	161625
practicalhelphh_resc	901	1.925	1.071	892	1.835	1.075	872	2.384	0.812	859	2.399	0.812
mathelp_resc	899	0.586	0.781	894	0.577	0.798	872	0.701	0.870	859	0.776	0.895
groupsin	904	0.579646	0.913	896	0.477	0.851	873	1.721	1.803	861	2.437	1.947

Note: Baseline and endline variables are labeled using the suffixes: *_bas* and *_ple*, respectively.

	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(%)	$k=30$	$k=40$	$k=50$	$k=60$	$k=70$	$k=80$	$k=90$	$k=100$
Treated	0.00 (0.00)	-0.04*** (0.01)	-0.11*** (0.03)	-0.11*** (0.04)	-0.08*** (0.04)	-0.03 (0.04)	-0.03 (0.02)	-0.02** (0.01)
Constant	0.01 (0.01)	-0.04 (0.03)	-0.19*** (0.06)	-0.44*** (0.09)	-0.74*** (0.09)	-0.47*** (0.09)	-0.11* (0.06)	-0.01 (0.02)
N	1674	1674	1674	1674	1674	1674	1674	1674
R ²	0.005	0.012	0.037	0.030	0.030	0.016	0.019	0.010

%19-Appendix 3 - Regression Results - Difference in Difference using First Differencing

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Controls included in the regressions are age, gender, household size, partner, only income earning, number of biological children, and ethnicity.

Appendix 4 - Regression Results - Difference in Difference Controlling for Individual Fixed Effects

	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(%)	$k=30$	$k=40$	$k=50$	$k=60$	$k=70$	$k=80$	$k=90$	$k=100$
Endline	-0.00* (0.00)	-0.02*** (0.01)	-0.13*** (0.02)	-0.36*** (0.03)	-0.49*** (0.03)	-0.37*** (0.02)	-0.11*** (0.02)	-0.01* (0.00)
Endline x Treated	0.00 (0.00)	-0.04** (0.02)	-0.10*** (0.03)	-0.11*** (0.03)	-0.08* (0.04)	-0.02 (0.04)	-0.03 (0.02)	-0.02*** (0.00)
Constant	1.00*** (0.00)	1.00*** (0.00)	0.99*** (0.01)	0.94*** (0.01)	0.79*** (0.01)	0.47*** (0.01)	0.14*** (0.00)	0.02*** (0.00)
N	3451	3451	3451	3451	3451	3451	3451	3451
R ²	0.002	0.046	0.182	0.350	0.444	0.297	0.087	0.015

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Controls included in the regressions are age, gender, household size, partner, only income earning, number of biological children, and ethnicity