

Household Bargaining Power and the Effect of Microloans

A thesis submitted by

Kate Hausdorff

In partial fulfillment of the requirements for the degree

Master of Science
in
Economics

Tufts University

May 22, 2016

Adviser: Professor Kelsey Jack

Abstract

Recent research suggests that intrahousehold decision-making plays a large role in determining outcomes for the household and that it is influenced by the relative bargaining power of household members. This study uses data from a randomized controlled trial of a loan program during the hungry season in Zambia to create proxies for household bargaining power and analyzes the heterogeneous impacts of the loans with respect to these measures. Spousal age discrepancy and a direct series of questions asking about decision making within the household seem to be the best proxies for female bargaining power. I find households with higher levels of female bargaining power experience larger differential effects of the loans on consumption and total harvest values, with the effects being particularly obvious within the cash loan arm as opposed to the maize loan arm.

Table of Contents

1. Introduction	1
2. Literature	5
3. Conceptual Framework	8
4. Study	11
6. Empirical Design	14
6.1 Measures of Bargaining Power	14
6.2 Outcome Measures	19
6.2.1 Measures of Household Member Well-being	19
6.2.2 Measures of Household Well-being	21
6.3 Identification	23
6.3.1 Identifying Equation	23
6.3.2 Sample Balance	24
7. Results	25
7.1 Effects on individual well-being outcomes	26
7.1.1 Consumption	26
7.1.2 School Attendance	30
7.1.3 Health	32
7.2 Effects on Household Well-being Outcomes	33
7.2.1 Harvest Value	33
7.2.2 Selling Assets	35
7.2.3 Savings	37
7.2.4 Luxury consumption	38
7.3 Results Summary and Adjustments for Multiple Testing	41
7.4 Additional Analysis	42
8. Conclusion	43
9. References	45
Tables and Figures	48
Appendix A: Harvest Survey Questions	59
Appendix B: Additional Analysis	60

1. Introduction

As the international development community tries to create programs to help impoverished people in the developing world, it is becoming increasingly apparent that household decision making dynamics are a crucial factor to consider. In the specific case of loan programs, considering that different members of a household likely have different preferences with respect to allocation of household resources, the relative bargaining power of the members could have a profound effect on the way a household might use a loan, and whether it will help improve the well-being of household members.

Though a vast amount of literature has attempted to analyze the effectiveness of loan programs on a variety of familial well-being outcome measures such as household expenditure, savings, health, and child schooling (Adato 2000, Rubaclava 2004, Duflo 2000, Pitt 1998) and many have attempted to measure relative bargaining power empirically (Hoddinott and Haddad 1995, Thomas 2002, Lundberg and Pollak 1997), fewer have combined the two. There has been even less done to address the potential heterogeneity in the effects of different types of loans with respect to women's relative bargaining power within the household.

This paper attempts to fill those two voids using data from a randomized controlled trial of a loan program in Zambia to explore the heterogeneity in the effects of the loans across households with different levels of female bargaining power. Two types of loans were employed during the experiment, a cash loan and a maize loan, so the cash vs. in-kind loan debate can be addressed through a gendered lens. In addition, the data collected for this experiment were not specifically designed to create measures of bargaining power. Therefore, this situation provides an

opportunity, drawing insights from focus groups and prior literature, to explore a variety of potential measures from existing data.

In the farms in the Chipata district of Zambia, harvest occurs once a year in May and June, and proceeds from the harvest are meant to sustain a family for the remainder of the year. This is not always possible, and thus the period of time from January to March is called the “hungry season”, when households do not have enough money or maize left from the previous harvest to feed their families. The study distributed cash and maize loans to small farmers in Zambia with the aim of smoothing households’ consumption throughout the hungry season (January to March). The sample included 3140 small-scale farmers and 175 villages split evenly into cash loan, maize loan, and control groups. The cash loan was 200 KW (approximately 40USD) and the maize loan was 3 bags of maize, intended to be roughly equivalent in value to 200 KW. For both loan groups, households were meant to repay after the harvest at roughly a 30% interest rate. For more details on the randomization process, derivation of interest rates, or preliminary results, see Fink et al. (2014).

Deriving inspiration from the literature and from focus groups conducted with respondents, this paper constructs several different potential proxies for female bargaining power within the household that fall under three main conceptual categories: external resources the wife of the male household head brings to the household, internal dynamics between the husband and wife, and attempts at direct measurement. Then, the differential effect of the loans by levels of women’s bargaining power on household well-being outcomes, such as consumption, health, harvest values and cash flows, is estimated.

Over all results are mixed. Households with higher levels of bargaining power generally seem to have higher levels of consumption. In the control group, this is particularly true for

households in which the wife participates in the household decision making process. For cash treatment households, consumption is higher when using the age difference between husband and wife and education difference as proxies for bargaining power.

Cash treatment households in which the husband was moderately older as opposed to a lot older than the wife consumed protein, on average, 30.6% more in the previous two days, significant at the 1% level. Households in which the female spouse is closer in age or older than her husband consumed protein 24.4% more than households in which he is much older, significant at the 5% level. In addition, households in the cash treatment group in which the female has the same or more education as her husband consumed protein 16% more in the previous two days compared to cash households in which the husband has more education, significant at the 10% level.

Higher levels of female bargaining power also seem to be associated with higher harvest values. In control households, higher harvest values are positively correlated with households in which the wife participates in household decision-making. In cash treatment households, the bargaining power proxy of age difference appears to have the strongest positive differential effect on harvest values, while the proxy of the wife's participation in household decision making has a strongly negative differential effect on harvest values.

Specifically, cash treatment households in which the husband is moderately older than the wife reported 12.8% higher harvest values, significant at the 5% level, as compared to households in which the husband is much older. Households in which the wife is closer in age or older reported 4% higher harvest values than cash households in which the husband is much older. Yet, cash treatment households in which the wife participates in household decision-making report nearly 6% lower harvest values.

Overall, the results suggest a few general conclusions. First to note is that across the different measures of bargaining power used in this analysis, it seems that the internal measure of the age difference between the husband and wife and the direct measure of whether she participates in household decision making are the measures in which we see the strongest correlations suggesting that they are capturing at least some of the dynamic. However, the incongruence of the results suggests that the two may not be capturing the same dynamic.

Interestingly, female bargaining power does not seem to have a monotonic relationship with the age difference between spouses. In fact, households in which he is moderately older had the strongest differential positive effects of the loans compared to households in which he was much older and even households in which she was older. The mean age difference is 6 years, so these results may suggest that households that are closest to the social norm age difference have the most balanced decision-making process.

Second, there seems to be stronger differential effects of the cash loan rather than the maize loan with respect to women's bargaining power. Traditionally in these villages, women are in charge of the food in the household. Therefore, there may not actually be much of a difference between the way the maize loan is used in households with higher and lower levels of bargaining power. However, in households that received the cash loan, if the woman has more bargaining power she may be able to exert her preferences on the use of the cash as opposed to a woman who does not have power.

Ultimately, though, many of the results are statistically insignificant and not suggestive of any sort of trend. It is possible that husband and wife resource allocation preferences are not different over all these outcome measures so that household decision-making really does not play much of a role in determining these outcomes for the household. It is also possible that because the

amount of the loans was relatively small, they did not have much of an effect on some of these outcomes, and therefore there are no heterogeneous effects with respect to bargaining power.

Additionally, while a large amount of time and thought went into the creation of these measures of bargaining power, they are inherently flawed. This is partially due to the data available, being that the study was not designed to measure bargaining power, and thus measures like whether she does other income generating activities are likely not accurately capturing the full effect of whether she brings income to the household. But ultimately, it also reflects the fact that household decision making processes are an extremely hard dynamic to measure and quantify. So while many assumptions can be made as to what affects relative bargaining power within a household, there will always be unobservable factors at work that will remain unaccounted for.

The rest of the paper is organized as follows: section 2 provides a summary of the theoretical and conceptual literature. Section 3 presents a conceptual framework to provide a basis for the analysis. Sections 4 and 5 describe the study and the data. Section 6 describes the empirical process in detail, including the construction of the measures of bargaining power and outcome variables, section 7 presents results and section 8 concludes.

2. Literature

Most literature on the household begins with modeling the framework of internal decision-making. The unitary model, or treating the household as a single production or consumption unit, is rooted in the idea that sources of income, control of assets and other measures of power structure heterogeneity do not influence outcomes (Doss 2013).

Much research has been done to question the validity of the unitary model. Thomas (1990) uses survey data on family health and nutrition in Brazil to reject the hypothesis that unearned income in the hands of the mother has no differential effect on the family's health than unearned income in the hands of the father (as the unitary model would suggest). Rather, he finds large positive effects on family health and child survival probabilities when mothers control the unearned income compared to fathers (Thomas 1990). Thomas and Chen (1994) reject that shifting the distribution of resources within households in Taiwan has no impact on household commodity demand.

A variety of models of collective behavior and intrahousehold bargaining have then been introduced as compliments or alternatives to the unitary model. Chiappori (1993) discusses a collective sharing model in which members of the household maximize the sum of their individual utility functions. The husband and wife decide how much of the pooled income is used for expenditures on public goods and the rest is allocated for private consumption. The ratio of expenditure on public goods and individual allocation are functions of who has more bargaining power, which enters the model as a weight on the utility functions (Chiappori 1993). This paper uses a form of this model, and it is discussed in more detail in Section 3.

When assuming any variation of the non-unitary household framework exists, evidence suggests that when women have more bargaining power within a household, resources are allocated more towards food consumption, education and other child goods (Lundberg and Pollak 1997, Pitt 1998, Thomas 2002, Hoddinott and Haddad 1995). In Cote d'Ivoire, Duflo and Udry (2004) measure the effects of rainfall shocks to crops on household expenditures. They find that shocks that increase the output of crops predominantly cultivated by women shift expenditures toward food consumption, and similar shocks affecting men's crops have no effect

on food purchases. Thomas (1994) linked women's bargaining power within the household to increases in child health (as measured by child height).

Some of the most common ways previous research has attempted to measure women's bargaining power are through earned income, assets and unearned income (Browning and Chiappori 1994, Doss 1996, Quisumbing 2000, Thomas 1997), direct questions (Patel et al. 2007, Gómez de León and Parker 1999), and age and educational differences (Haddad and Hodinott 1995, Thomas 1994, Browning et al. 1994). This work is discussed in more detail in section 6.1.

The literature on cash transfers follows a similar pattern when analyzed by the gender of the recipient. Duflo (2000) examined the effects of the expansion of the South African Pension Program and found a large improvement in the health and nutrition of children when the recipient of extended benefits was female. In a study analyzing three different microcredit programs in Bangladesh, Pitt and Khandker (1998) found that when women were given the loans, household consumption expenditure and the probability of girl's school enrollment increased. Additional income provided by the Mexican cash transfer program, PROGRESA, showed the money in the hands of the women was spent on child goods, improved nutrition and investments in livestock (Rubalcava 2004, Adato 2000).

Much of the literature on cash vs. in-kind transfer programs concludes that while in-kind transfers do seem to have larger effects on consumption than cash transfers, the effects on other outcomes are generally not significantly better than the effects of the cash transfers (Aker 2013, Cunha 2012, Hoddinott et al. 2013, Skoufias et al. 2008). Studies done with transfer programs might have larger or longer-term effects than loan programs as the recipients do not have to repay the transfer and potentially the influx of cash and goods might change market prices

(Cunha 2012). However, the initial uses of the transfer are still applicable for comparison to the loan setting. In general, very little has been done to build on this literature and explore the heterogeneous impacts of cash vs. in-kind loans or transfers due to women's bargaining power in the household. Of these papers, Hoddinott et. al. (2013) tested but found no significant heterogeneous effects based on the gender of the household head that received the transfer.

Thus, this paper contributes to the existing literature by exploring possible measures of female bargaining power in a heavily gender normative society and by adding to the limited analysis of differential effects of female bargaining power on cash and in kind loan outcomes.

3. Conceptual Framework

Consider a model of the decision making process within the household, in which the two actors, husband and wife, have different preferences for the same goods. Browning and Chiappori (1993) outline what they consider to be a collective sharing framework. In this setting, each actor $I=A,B$ has a utility function $U^I(\mathbf{q}^A, \mathbf{q}^B, \mathbf{Q})$ where \mathbf{q}^A and \mathbf{q}^B are the private consumption for actors A and B respectively, and \mathbf{Q} is public consumption.

Notice that each member's utility is a function of the other's private consumption, hence the collective process. In addition, $U^I(\cdot)$ is increasing in $(\mathbf{q}^I, \mathbf{Q})$ although not necessarily in \mathbf{q}^J for all J not equal to I , allowing for selfishness or negative consumption externalities (Browning 1993). Browning and Chiappori show that a Pareto efficient outcome results from the following maximization of household utility

$$V(\mathbf{p}, \mathbf{x}, \mu) = \max_{\mathbf{q}^A, \mathbf{q}^B, \mathbf{Q}} \mu(U^A(\mathbf{q}^A, \mathbf{q}^B, \mathbf{Q})) + (1-\mu) U^B(\mathbf{q}^A, \mathbf{q}^B, \mathbf{Q}) \quad (i)$$

Subject to the household budget constraint: $\mathbf{p} * (\mathbf{q}^A + \mathbf{q}^B + \mathbf{Q}) = \mathbf{x}$

Where μ is a bargaining weight on member A's utility function that summarizes the decision process, ranging from 0 to 1, and $1 - \mu$ is a weight on member B's utility function. P is a vector of prices and x is total household expenditures. Many environmental factors can affect μ and they determine where on the Pareto frontier the final outcome of the decision making process will fall.

It clearly follows that if $\mu=1$, the household maximization problem becomes

$$\text{Max } U^A(\mathbf{q}^A, \mathbf{q}^B, \mathbf{Q}) \text{ st. } \mathbf{p} * (\mathbf{q}^A + \mathbf{q}^B + \mathbf{Q}) = x \quad (\text{ii})$$

In which person B's utility function does not factor in at all, and his/her private consumption, \mathbf{q}^B , only enters the problem through person A's utility function and the budget constraint. Likewise, if $\mu=0$, person A's preferences disappear from the maximization problem entirely. The solution to program (i) is a vector of quantities, $\mathbf{q}=\mathbf{f}(\mathbf{p}, x, \mu)$, which, it is important to note, is a function of μ as well (Browning et al. 1993).

Figure 1 shows this situation along a Utility Possibility Frontier (UPF), which is a function of prices and total expenditure. Suppose that the wife (person B) prefers to spend household money on food for the household, while the husband (person A) prefers to buy beer. If μ (the slope of the UPF) is large, equation (i) favors the husband and household utility ends up at the tangent point on the UPF closer to U^a in Figure 1. With his preferences more heavily weighted, more household resources will be used for beer. If μ is small, then the wife has more bargaining power, household utility falls at the tangent point near U^b on the UPF, and more household resources are allocated toward food.

A loan enters this framework as an increase in income through the budget constraint. This implies that the loans should have no effect on the bargaining weights on each utility function, as they are assumed to be a pre-existing state. Therefore, the use of the extra household income

from the loan, or the household utility solution, \mathbf{q} , is determined by the current bargaining power structure of the household. With regard to Figure 1, this introduction of income would simply push out the UPF to the right, to allow for higher possible utility, but would not change the relative tangent point location because μ would still have the same value.

Notice, in addition, that if person A and person B's preferences with regard to a certain outcome are not different, then each person's relative bargaining power does not play a role in determining the household outcome. Additionally, if household outcomes are not Pareto efficient, then this framework cannot apply.

While evidence from the literature might suggest that the wife's private consumption tends to be less self-indulgent than the husband's and that her utility function likely favors higher levels of public goods for the household, \mathbf{Q} , we cannot actually observe either person's utility function, and are therefore prevented from using the model to make concrete predictions outcome by outcome. Instead, turning to the data shows some suggestive empirical evidence of ways in which husband and wife preferences may be distributed.

If the measures of bargaining power, or μ , exactly measure the dynamic they are intended to capture, one would expect the correlations between the power measures and the outcome variables that the literature suggest women favor, such as consumption, to be positive for the control group, and for the loans to have positive differential effects relative to a higher level of bargaining power.

However, because we cannot actually observe preferences, for those outcomes for which there is no effect, it is difficult to say whether member preferences are the same, the household is not Pareto efficient, or if preferences simply follow less predictable patterns than the literature suggests.

4. Study

The RCT was designed to estimate the productivity impact of short run loans offered during the hungry season on household-level outcomes. In Zambia, the rainy season is from November to April and harvest takes place in May and June. Household food reserves, however, deplete over the year and are most scarce from January to March. This period of time is considered to be the “hungry season”.

The study was constructed with a sample that was meant to be representative of Chipata District in Eastern Zambia, including villages from a geographic spread spanning 50 out of 53 camps across the district.

For the purpose of attempting to identify power dynamics between couples, the sample was limited to married, male-headed households. Female-headed households exist in the original sample but only due to certain circumstances such as the husband is away, deceased or she is divorced. Therefore, power dynamics in these households are not directly comparable to male headed, married households. The final sample included 2,215 households interviewed at Baseline. Attrition is discussed in more detail in section 5.4.

Two types of loans were offered to randomly selected households: a maize loan and a cash loan. In year 1, 735 farms in the limited sample were assigned to the cash loan program, 751 farms were assigned to the maize loan program, and 729 farms were assigned to the control group, which received nothing.

In year two, treatment was reassigned. 1,168 farms were assigned to the control group, 516 were assigned to the cash loan group and 531 were assigned to the maize loan group. Some households that were treatment households in year 1 became control households in year two and vice versa. However, no households switched treatments. That is to say, no cash loan

households in year 1 were assigned to the maize loan in year 2 and vice versa. A little over 50% of households were assigned the same treatment status in year 1 as year 2.

The maize treatment group was offered three 50-kilogram bags of unpounded maize, which is enough to feed a family of five for at least two months. The cash loan group amounted to 200 Kwacha (about 40 USD). The idea was to have the loan amounts be as comparable as possible. For both treatment arms, the loan offer was announced in early January, during a village meeting to which only eligible households were invited, and the repayment was due in July. Households could repay either 4 bags of maize or 260 Kwacha, no matter which treatment arm they were a part of. See Fink et al. (2014) for more detail regarding the design of the study and for general loan impact results.

5. Data

This analysis mainly relies on survey data, collected by enumerators in the villages chosen for the RCT. The enumerators spoke with a member of the household who was often, but not always, the household head.

In total, the project had eight survey rounds over the course of two years:

- Baseline Survey: conducted from November to December of 2013 with household heads from up to 22 households per village. It includes detailed household demographic information such as the household head gender, age and education of all family members, child school attendance, and household characteristics. In addition it includes initial total harvest values, self reported health measures, and savings.

- Midline survey: conducted from February to March of 2014 (the hungry season). This was a survey of 1200 (832 in the limited sample) randomly selected households asking recall questions about topics including family health, consumption, and self-reported health measures.
- Harvest survey: conducted July through September of 2014. It surveyed all baseline households and included questions about changes to consumption, agricultural productivity, savings, as well as health, and child school attendance. In addition, there was a set of questions about decision making within the household, used to create a measure of female bargaining power. This module of questions is presented in Appendix A.
- Labor Surveys: Four survey rounds conducted over the two years, of about 70 households per week. They include short recall questions about consumption and labor, as well as household expenditures, savings and health.
- Endline Survey: conducted July through September of 2015. It surveyed all Baseline households, asking many of the same questions as the previous major survey rounds about yields, labor, school attendance and savings.

Data for this analysis came from a variety of these surveys, as not every variable is found in every survey. See Table 8 for a complete list of outcome variables by survey round. All measures of female bargaining power are constructed using Baseline data, when possible, to be able to assume they are independent of treatment and time.

6. Empirical Design

6.1 Measures of Bargaining Power

To identify possible measures of bargaining power within the data, imagine an ideal world, in which the decision-making dynamics between the spouses are observable. What factors might be notable? What elements ideally measurable? Beginning at this point generates three distinct conceptual categories of bargaining power measures: external, internal and direct. Table 1 presents summary statistics for all measures used in the analysis.

External Resources

The literature strongly suggests that one area to focus is on external factors that the spouse brings to the household. A person can be assumed to have more power over the resources he/she owns, and use of that resource would be easily attributed to that member of the household. In addition, a household member's bargaining power is likely to be increasing in the amount of resources they bring into the household.

Browning and Chiappori (1994) are able to show that earned income is a central factor contributing to the decision-making allocation process. Chen and Thomas (1993), and Schultz (1990) also focus their research on earned and unearned income. In addition to income, assets owned by the different members within the family (Doss 1996, Quisumbing 2000, Thomas 1997) have also been used as determinants of women's power within the household. In Indonesia, the resources brought to a marriage are shown to be a good exogenous measure of ownership of certain resources. (Thomas 2002, Schultz 1990).

The data for this study are limited in their measures of external resources brought to the household. There are no measures of how much income the female spouse earns, whether she

owns a side business, what assets individual members of the household own, or any data on what each individual brought to the marriage. Instead, coarser proxies for ownership must be used.

Traditionally in Zambia, groundnuts are a crop cultivated by women. Thus, the share of the household farm devoted to groundnuts may be a good proxy for income she is earning in the household. This idea is supported by anecdotes from focus groups in which women reported not only being in charge of the groundnut crop, but also in some cases being able to keep some of the income earned from that harvest.

Groundnuts, however, are inextricably linked to agricultural output, so the measure's use is limited, and it is difficult to interpret with regard to harvest value outcome measures. It is also not universally true that women are the sole cultivator of groundnuts nor that in every household the income earned from groundnuts is attributable to her.

I also use a binary measure derived from a survey question of whether the female spouse does "other income generating activities" for the household. "Other" refers to activities besides piecework, or working on others' farms. Table 1 shows that, at Baseline, 18% of households reported that the wife engaged in income generating activities besides piecework. Although what these activities are is not specified by the survey question the variable comes from, this binary measure also serves as a proxy for whether she earns income for the household.

The measure has obvious flaws in that it is unknown what these income generating activities are and how much she is earning from them. It is also unclear whether these activities are potentially taking time away from her household/farm responsibilities or are being done in addition to them. These issues will be revisited in discussion of the results in section 7.

Internal Dynamics

Internal factors also play a prominent role in household decision-making processes. Specifically, the relationship between the husband and wife might have a substantial effect on the bargaining weights in the household utility maximization. Ideally, we would want to observe the strength of their personalities, and get an idea of who dominates the other in arguments. Clearly this is a nearly impossible factor to measure, but other physical traits about the spouses can be used as proxies for this dynamic.

Haddad and Hodinott (1995) and Thomas (1994) both use discrepancy in educational attainment between the spouses as indicators of bargaining power. Browning et al. (1994) are able to show that relative age between husband and wife, in addition to their earned incomes, is also a large contributing factor toward decision-making. Patel et al. (2007) suggest using weight-for-age-z-scores and height-for-age-z-scores between fathers and mothers of a household arguing that low z-scores reflect a lower capacity to contribute to the household via low productivity or low human capital and thus can indicate low bargaining power.

Without anthropometric measures for the household head and spouse, the best that can be done is to proxy their dynamic with discrepancies between their education and age. The assumption made here is that the closer they are in age or educational attainment, the more balanced their decision making process may be, and that potentially, if the female spouse is older or more educated this translates into her having more power in the decision making process.

Table 1 shows that the mean age difference between the husband and wife is 6 years. To better see the heterogeneous effects of age difference, the sample was split into three equal sized groups generating three categories in age difference: the female is older or within three years younger than her husband, the husband is older by 4-7 years, or “moderately older”, and the husband is 7 or more years older, “much older”, (the omitted category in these tables). All

results are interpreted in comparison to households in which the husband is much older, which are assumed to be households in which the wife has the lowest levels of bargaining power.

Table 1 shows that the average educational difference between the husband and wife is just 1 year. It is unlikely that bargaining power has a strictly linear relationship with the educational difference between the husband and wife, and therefore a continuous measure would not be an accurate depiction of the relationship. Instead, a binary measure of whether she has the same level or more education than him is used.

Direct Observation

A third type of measure would involve direct observation of the balance of decision-making power within the household. If we could be there and observe the decision making process as it occurs, we could, of course, understand the dynamics much better. However, we are unable to truly observe this.

Other studies have tried to proxy observation of decision-making in different ways. The PROGRESA program specifically used women as recipients of the loan, under the assumption that she would then be forced to be a part of the decision making process with regard to the loan. In a study examining the PROGRESA program, Gómez de León and Parker (1999) attempted to “rank” the outcomes of a set of questions in terms of women’s empowerment as follows: a woman is most empowered when she makes the decision alone, followed by joint decisions, and least empowered when her husband makes the decision alone. Patel et al (2007) asked both husband and wife several questions about who makes decisions within the household. They created a dummy variable if the answers matched and multiplied it by dummy variables indicating the type of household (wife makes decisions, husband makes decisions, or both do).

The study in Chipata included a module of questions¹ asking who in the respondent's household makes decisions about certain goods. The response options were “the husband”, “the wife”, or “together.” A binary indicator of whether the wife is reported to participate in any household decision-making is constructed from the responses to this set of questions. That is, if a response to any of these questions was that the wife makes the decision, or that they make the decision together, she is presumed to be at least a part of the decision making process. Table 1 shows that this is the case for 57% of households.

The module of questions was not asked in the Baseline survey, however, so for sufficient observations this bargaining power variable had to be constructed from the Harvest survey data, increasing the likelihood that the responses were affected by treatment.

Another direct observation of the decision making process might be whether she participated in the study at all. If she is able to represent the household by being a respondent to one of our surveys, we might assume she has a higher level of power within her household than a woman who is never allowed to represent her household in this way. Therefore, initial analysis included a binary indicator of whether she was the respondent to any survey round.

This measure does, however, have several problems. Only 12 households in the sample had female spouses who responded to the Baseline survey, providing too little variation to use only Baseline data. Though regression results of survey participation on treatment show no significant correlation between the two, it is possible that the treatment affected whether the spouse participated in the surveys as the study went on. In addition, it may not be entirely clear what her responding to a survey indicates about the household dynamics. It is possible that it indicates she has higher levels of power, but an alternative explanation might be that the husband does not

¹ The full set of decision-making survey questions is presented in Appendix A.

want to respond, so he sends her instead. For these reasons, this measure is considered to be relatively weak and is not used in the analysis presented in section 7.

6.2 Outcome Measures

The ultimate objective of this analysis is to assess the extent to which higher levels of female bargaining power influence whether loans improve well-being. Therefore, outcome measures were chosen to be the best indicators of household welfare. They fall into two main conceptual categories, created somewhat arbitrarily: measures of household members' well-being, and overall measures of the household's well-being. It is important to note, however, that these categories are purely organizational, not necessarily mutually exclusive, and that almost all outcome measures in both categories are measured at the household, not individual level. Tables 2A and B present summary statistics for all outcome variables in year one and two, respectively. Missing values in Table 2B indicate the data for that outcome was not available in year two.

6.2.1 Measures of Household Member Well-being **Consumption**

In poor households, measures of how much or how often members are able to eat, are generally good indicators of how well the members of the household are doing. The common food for villagers in Chipata is called "nshima," a nutrient-deficient starch made from maize that is eaten, preferably with vegetables or meat, but as is often necessary, also eaten plain. This analysis uses a measure of the average times members of the household have eaten nshima in the previous two days. The mean is 3.8, which considering this is the main and/or only food the villagers eat, is relatively small. The same measure was constructed for the average times members of the household have eaten protein in the previous two days. Protein is expensive and

a less common occurrence in daily diets, as is evident in Table 2A, where on average households ate protein only 1.3 times in the previous two days.

A final measure of consumption was calculated from the answers to a series of questions asking whether the household had enough food to eat in each month of the year. The measure is a proportion of the number of months the household reported having enough food out of the number of months they were asked about. Interestingly, this measure varied greatly across the two years, with 47% of households reporting they had enough food in year 1, and 69% of households reporting that they had enough food in year 2.

Health

Two self-reported health measures from the survey are used to estimate an overall picture of the respondent and the household's health status. The first is from responses to the question, "Overall, how would you rate your own health?" on a scale from 1-5, 1 being poor and 5 being excellent. A household status measure is constructed from responses to the question, "Overall, how well do you think your household has been doing in the last six months?" The response options were on the same scale, from 1-5, 1 being poor and 5 being excellent.

Both of these measures are an assessment of the respondent's perception of their own and their household's well-being, which, while not an accurate measure of his/her actual health status, provides insight into their current outlook.

School Attendance

In the villages in Chipata district, education is certainly regarded positively. However, there are fees to attend schools, which are often not the household's first priority when it comes to spending. Therefore, if many children in a household are attending school, it may be a good indication that generally members of the household are doing well.

This analysis uses a measure of the number of children reported to be attending school in the household out of the number of school-aged children in the household. School-aged is considered to be from 6-20, based on the data. On average, about 57.5% of school age children are attending school in year 1, and 63% in year two though the standard deviations are large, around 37% in both years..

6.2.2 Measures of Household Well-being

Savings

As a measure of the household's overall well-being, its liquidity is of interest and can be observed by looking at outcome variables related to household savings. Two different estimates of the household's savings were created, first whether the household has any savings at all at and then the logarithm of the continuous measure of their reported savings. Roughly 65% of households reported having any savings in year 1, and 70% reported having any savings in year 2.

These two measures are self reported, however, and some respondents may have reason to underreport their savings in hopes of receiving more help if it appears their household is fairing poorly. In addition, they may not even know the exact amount of money they have in their savings at that moment. Therefore, the continuous measure will provide very noisy results and is probably not that accurate in the first place. So, the binary indicator of whether the household reports currently having any savings is used in the analysis presented in section 7.

Selling of Assets

In poor households, assets are a form of savings and the selling of assets can be thought of as liquidating some of the household reserves. This paper's analysis uses two measures of asset sales: whether the household sold any livestock, the most common asset sold, and whether the household sold any "household items".

In year 1, 33% of households reported selling livestock and only 9% reported selling household assets. In year two, around 42% sold livestock and 10% sold household items. The low percentage of people selling household items may be attributable to the fact that these households are poor and do not own very many assets to begin with, so selling them is not a common occurrence. Potentially, in addition, because everyone is poor, there may not a strong market for the household items amongst their peers.

Luxury Consumption

Beer and cigarettes can be thought of as “luxury goods.” That is, goods that are not necessary for the household and consumption of them is a form of excess. In addition, consumption of these goods only benefits the person who is consuming them and uses income that might otherwise be used for a different purpose. In these villages in Chipata district, cigarettes and alcohol are almost exclusively consumed by men. Therefore, there is reason to believe the amount of luxury goods consumed by a household will vary with the amount of bargaining power the female has, and her ability to limit the purchase of luxury goods.

A binary measure indicating if any member of the household bought beer or cigarettes in the previous four weeks is used in this analysis. On average, around 32% of households in year 1 reported having done so, though this estimate is likely low since respondents may not admit to purchasing these goods for fear of judgment by the enumerator.

Harvest Values

Finally, agricultural harvest values can be thought of as a good proxy for overall household prosperity. Changes in harvest values reflect changes in other household factors that contribute to yields, such as the health of family members or liquidity issues. The measure used in this analysis is the overall total harvest value of the household farm.

Harvest values are also a reflection of prices, however, and this measure of harvest value does not assume constant prices. Since the goal of this metric is to approximate the household's income from their farm, including changing prices in the measure is logical. It accounts for the possibility that the household may now be better able to find good markets due to receipt of the loan. Estimation was also done, however, assuming constant prices, to isolate the quantity effect of a change in harvest values. The results follow a very similar pattern as the original measure, and can be found in Appendix B.

6.3 Identification

In order for a randomized controlled trial to be considered an effective method for reducing selection bias, the different treatment groups cannot be systematically different in the absence of treatment. If it can be shown that the households in the different treatment arms are not different across a variety of characteristics measured at Baseline, then it can be assumed that they are not systematically different in any way before the introduction of treatment and thus indicating that the randomization was effective.

6.3.1 Identifying Equation

The estimation equation in this case is then:

$$Y_{ivt} = \alpha + \beta \cdot T_{ivt} + \gamma \cdot P_{iv} + \delta(T_{ivt} \cdot P_{iv}) + \mathbf{X}_{iv}\theta + \tau_t + \varepsilon_{ivt} \quad (1)$$

where Y_{it} is one of the outcome measures detailed above for individual i , in village v , in time t , T is an indicator variable for pooled (cash and maize) treatment, P is a bargaining power variable and the coefficient of interest is δ , the differential effect of treatment interacted with bargaining power. X is a vector of the controls presented in Tables 1 and 2, as well as baseline values of the outcome variable for savings, school attendance, harvest values and total assets. τ is a year fixed effect, included because in year 2, Zambia received much less rain than normal.

Therefore, conditions were very different for these households across the two years and a year fixed effect helps make the estimates less noisy. All standard errors are clustered at the village level.

While estimates from equation (1) are useful, the results presented in section 7 are from analysis using the following equation in order to observe the differential effect of each loan type with respect to female bargaining power:

$$Y_{ivt} = \alpha + \beta_1 \cdot T_{1ivt} + \beta_2 T_{2ivt} + \gamma \cdot P_{iv} + \delta_1(T_{1ivt} \cdot P_{iv}) + \delta_2(T_{2ivt} \cdot P_{iv}) + \mathbf{X}_{iv} \theta + \tau_t + \varepsilon_{ivt} \quad (2)$$

where T has been split into T₁ and T₂ for cash and maize loan treatments respectively, and the main coefficients of interest are δ_1 and δ_2 , displaying the differential impact of each loan type when interacted with the bargaining power variable.

6.3.2 Sample Balance

As previously mentioned, the sample was limited to married, male-headed households for a total of 2,215. Tables 1 and 2 show the balance across treatment arms for year 1 and 2 of a variety of baseline measures. By and large, most variables are not significantly different between any of the three treatment arms in either year. The only difference significant at the 1% level is the number of acres of cash crops between year one treatment arms. Accounting for the small differences by including all covariates in Tables 1 and 2 in the regression analysis, the lack of other significant differences suggest that we can assume the absence of selection bias due to the randomization still applies to this limited sample.

Table 3 shows the balance across treatments of the initial bargaining power measures described in section 6.1. The only measure that is significantly different between treatment arms is the share of the household farm that is devoted to groundnuts, which is significant between the cash and maize loan treatment groups in both years and significant between control and cash

groups in year 2. For this reason along with the other problems with the measure described in section 6.1, the analysis presented in section 7 excludes “groundnuts” as a measure of female bargaining power.

Finally, Table 4 displays the balance across treatment groups of attrition in year 1 and year 2. Overall, attrition is only 5.17% of the limited sample baseline population, but we might be worried about it if a disproportionate number of people attrited from one treatment group. Table 4 shows that this is not the case, with around 2% attriting in year 1 from all three treatment arms. In year two, though the control arm has about twice as many households the treatment arms, the share of households that attrited is nearly the same.

Therefore, with the limited sample remaining relatively balanced, it can be assumed that equation 2 can be estimated without the presence of selection bias.

7. Results

The results are shown in 6 tables, organized by outcome measures of individual well-being, consumption, health and school attendance (Tables 7A, 8A, 9A) and overall household well-being, cash flow outcomes and harvest values (Tables 7B, 8B, 9B). They are also organized by the female bargaining power measure used. Tables 7A and 7B present results using external measures of bargaining power, specifically whether the spouse participates in other income generating activities. Tables 8A and 8B use internal measures of female bargaining power, namely age difference and educational difference between the spouses. Tables 9A and 9B use the most direct measure of bargaining power, derived from the survey questions asking whether the female spouse participates in the household decision making process.

The following section discusses in detail the impacts of the loans on each outcome variable when different measures of female bargaining power are incorporated into the analysis by first noting any correlational relationships between the outcome and the measures of bargaining power in the control group, and then the differential effects of the loans interacted with bargaining power.

Analyzing the results in this way can be thought of as two step process: first, observing if there are any initial reasons to believe each outcome measure will be affected by different levels of bargaining power (through the control group) and then second, given the first step, does the outcome measure respond to the interaction of the loans and bargaining power. As discussed in section 3, were these measures of bargaining power, or μ , exactly measuring the dynamic they are intended to capture, one would expect positive correlations between the power measures and the outcome variables that the literature suggests women favor, and for the loans to have positive differential effects relative to a higher level of bargaining power on these outcomes as well.

For the reasons discussed in previous sections, the share of the household's farm devoted to groundnuts, and the wife's participation in the survey have been removed as female bargaining power variables, and the continuous measure of savings has been removed as an outcome variable for the final analysis tables.

7.1 Effects on individual well-being outcomes

7.1.1 Consumption

Recall that this analysis uses three different measures of consumption: the average number of times members of the household have eaten nshima and protein in the last two days, and a ratio of how many days out of the year the household had enough food to eat.

Looking back to the conceptual framework presented in section 3, examining the correlational relationships between the bargaining power measures and the outcomes in the control group is effectively examining possible values of μ and thus where on the initial UPF the household falls. The positioning on the UPF can then give insight into each member's preferences based on μ 's correlation with outcomes.

While the spouse participating in other income generating activities (OIGA) does not seem to be associated with higher levels of protein or nshima consumption for the control group in Table 7A, there is a significant positive correlation with the household having enough food more months out of the year. This could be the variable picking up an income effect. That is to say, households in which the wife does OIGA tend to be wealthier and have enough food more often. Age and educational differences seem to be negatively associated with consumption in Table 8A, though no results are significant at the 5% level. Table 9A, though, shows that the spouse participating in household decision making is very strongly correlated with higher levels of nshima consumption, significant at the 1% level, and with the household having enough food, significant at the 5% level.

With regard to treatment households, column 1 of Table 7A shows that in households where the spouse does not do any other income generating activities (OIGA), both loans had a positive effect on consumption. However, there doesn't seem to be much of a differential effect for households that received the either loan in which she does OIGA.

Column 2 shows that both loans had a negative effect on protein consumption in households where the spouse does not do OIGA but a positive effect in households in which she does. In column 3, cash households had enough food 1.8 percentage points more over the year and maize households had enough food 3.4 percentage points more than control households, but households

in both treatment arms in which she does OIGA reported having enough food less often than treatment households in which she does not.

Thus, the wife participating in OIGA does not seem to be largely associated with increased household member consumption.

Panel A of Table 8A displays the results of the loans on consumption and health when using the age difference between spouses as a measure of the wife's bargaining power within the household. Column 2 of Table 8A shows that cash treatment households in which the husband is moderately older consumed, on average, 30.6% more protein in the last two days than households in which the husband is much older, significant at the 1% level. Households in which the female is older consumed, on average, 24.4% more protein in the last two days, significant at the 5% level. Maize loan recipients also have positive differential effects on protein consumption, but these results are not significant.

Households in which the male was moderately older and received the maize loan also reported having enough food, on average, 3.3 percentage points more than maize households with much older husbands, significant at the 5% level. In fact, both loans had a positive differential effect on households having enough food to eat over the year when the husband and wife are closer in age, though these results are not significant.

Panel B of Table 8A shows that in cash loan households in which the wife has equal or more education to her husband, the household consumed 3.5% more nshima, significant at the 5% level, and 16% more protein, significant at the 10% level, in the previous two days than cash treatment households where the husband has more education. The maize loan also had positive differential effects for households in which the female spouse has more education, but these were small and not statistically significant.

Therefore, the cash loan specifically had positive differential effects on household consumption in households where the spouses are closer in age and education.

Interestingly, in Table 9A, though the spouse participating in household decision-making is strongly correlated with higher levels of consumption in the control group as was previously mentioned, there does not seem to be much of a differential effect of her participation in either of the treatment arms.

Ultimately, both loans seem to have had a relatively consistent larger effect on the household's consumption in households where the spouses are closer in age and education, with most of the effects coming from the cash loan. Following from the conceptual framework in section 3, this may indicate, as the literature suggests, that wives' preferences favor consumption more than husbands', as when her utility function is more highly weighted in the household maximization, more is consumed.

The majority of results stemming from the cash loan could be because traditionally in these villages, women are in charge of food in the household. Referring back to section 3, if there is no difference in preferences for the use of the maize loan, in that it is always designated to the wife for use, then whether she has high or low levels of bargaining power would not play a role in determining household outcomes. However, if preferences are different with respect to the use of the cash loan, as they are assumed to be, women who have higher levels of bargaining power in their household may be given more access to the cash loan, and are able to exert their preferences on the use of it, which leads it to be used to help feed the household.

This trend of increased consumption is not unanimously consistent in the results, however, and this highlights some of the issues with attempting to measure bargaining power. While households with spouses closer in age and education experienced positive differential effects of

the loan on their consumption, there was virtually no correlation between these power measures and consumption in the control group. Conversely, control households in which the spouse participates in household decision-making were strongly correlated with higher levels of consumption, but there seems to be no differential effect of either loan relative to this bargaining power measure. This might be the first indication that these bargaining power measures, despite their intention, are capturing different dynamics.

In addition, in column 3 of Table 7A, cash and maize households reported having enough food 1.8 and 3.4 percentage points more than the control group, and control households in which she does OIGA reported having enough food 2.2 percentage points more. However, treatment households in which she does OIGA reported having enough food around 3 percentage points less. All of these results are statistically significant. This could reflect a wealth effect, where these households in which the wife does other income generating activities are wealthier and less credit constrained, therefore the loan does not have a large differential impact for them. Thus the OIGA variable may be picking up other factors besides relative bargaining power.

7.1.2 School Attendance

Recall that the measure of school attendance used in this analysis is the proportion of school-aged children (6-20 years old) in the household who are actually attending school. This measure is recorded as a missing value if the household does not have any school aged children.

None of the measures of bargaining power are significantly associated with higher levels of school attendance in control households, though most of the coefficients are positive.

Across all the tables, for households with low levels of female bargaining power, school attendance is often negatively associated with receipt of the loans, and in particular the cash loan, compared to the control group. This trend is a little peculiar, and does not seem to be mitigated

by most of the measures of women's bargaining power used. In fact, throughout Tables 7A and 8A, there are very small, insignificant and negative effects on school attendance associated with the measures of women's bargaining power and the loans.

However, in column 6 of Table 9A, households that received the cash loan in which the female spouse participates in the decision making process had, on average, 4.5 percentage points more school age children attending school than cash households in which she does not make decision. This figure is significant at the 10% level and nearly negates the negative effect the cash loan seems to have on school attendance.

In general, female bargaining power seems to have very small effects on school attendance. This may be evidence that, as was reported in focus groups, men and women actually do not have very different preferences when it comes to education. As mentioned in section 3, if the husband and wife do not actually have different preferences with regard to child education, according to the conceptual framework specified, the member's relative bargaining power may not have much of an effect on educational outcomes for the household.

It should be noted that those children attending school who are in their later teenage years, are likely attending some sort of university rather than grade school. It seems probable that the monetary burden of child school attendance might be different, or fall under a different member's responsibilities depending on the age of the child. To be sure the results were not wildly different if the age range was changed, the same analysis was also done using an age range of 6 to 16 years rather than 20. The results are presented in Table 16 of Appendix B. While the Baseline and control proportion of children attending school are higher, the effects of treatment remain relatively similar.

7.1.3 Health

This analysis uses two self-reported measures of health with available responses coded from 1-5, 1 being poor and 5 being excellent. The two measures are responses to how the respondent would rate their own health, and how their household has been doing over the last six months.

Table 7A shows that the female spouse participating in OIGA is very positively correlated in control households with both self-reported health estimations, significant at the 1% level. This result is, again, possibly a reflection of the additional income brought into the household by these activities, helping to keep the members healthier, or at least with a more positive outlook on their health. The spouse participating in household decision making is also statistically significantly positively correlated with these health measures in columns 3 and 4 of Table 9A, while the age difference and education measures show no notable relationship in Table 8A.

For treatment households, columns 4 and 5 of Table 7A show that respondents from households that received a loan, and particularly the cash loan, reported significantly higher estimations of their own health and the well-being of the household than the control group, and control households in which she does OIGA also reported significantly higher estimations of their wellbeing and of the household's. However, the differential effect of the loan on these health measures in households in which she does OIGA is actually negative, and significant at the 5% level for the cash loan.

In column 5 of Table 8A, we see that households with much older husbands that received a cash loan reported a significantly positive estimation of their household's well-being. However, the differential effect of either of the loans over the two age gaps is negative. Both loans also had a positive effect on the respondent's estimation of their own health in households where the male

is much older. However the maize loan had a negative differential effect for both of the other two age groups.

A similar trend follows for both treatment arms in Panel B, where treatment households in which the husband has more education reported, on average, positive estimations of their household's well-being but treatment households in which the wife has the same or more education reported more negative estimations.

In columns 4 and 5 of Table 9A, there, again, are no significant differential effects of the loan in households in which she participates. Though most of these different effects are positive, they are small.

There seems to be a general positive effect of the loans on the respondent's evaluations of their own and their household's health, and some of the bargaining power measures seem to be associated with better health in the control group. However, there is relatively little evidence of a differential impact of the loan in households where women have more bargaining power, measured in any of these ways.

7.2 Effects on Household Well-being Outcomes

7.2.1 Harvest Value

The measure of harvest value used as an outcome in this analysis is the total value reported in Zambian Kwacha, and does not assume constant prices.

In Table 7B, in control households the wife participating in OIGA has a negative correlation with harvest values, significant at the 5% level. This may be reflecting her time participating in these activities away from working on the farm, rather than her relative power in the household. Her participation in household decision-making is strongly positively correlated with harvest

values, however, significant at the 1% level. Interestingly, once again there is no significant effect of age difference or education differences between the spouses for the control group.

For treatment households, in Table 7B, columns 5 and 6 show that cash loan households reported higher harvest values than control households, and while the spouse participating in OIGA is negatively associated with harvest values, there is a positive differential effect of the loans for households in which she does OIGA, though this result is not significant.

Columns 5 and 6 of Table 8B show that cash treatment households in which the husband is moderately older, report, on average, 12.8% higher harvest values than cash households where the husband is much older, significant at the 1% level. Cash households in which the wife is nearly the same age or older also report, on average, 4% higher yields than cash households in which the husband is much older, significant at the 10% level. The results for the maize loan also suggest differentially higher harvest values for households in which the spouses are closer in age or the female is older as compared to those where the husband is much older, but these results are not significant.

Therefore, the cash loan had a significant positive effect on harvest values in households where the spouses are closer in age.

Panel B of Table 8B reports that there does not seem to be much of an effect of a differential effect of the loans on harvest values with regard to education difference between the spouses.

In columns 5 and 6 of Table 9B, in households where the female spouse does make decisions, the cash loan had a 5.8% negative impact on harvest values, leading to an overall almost 0 net effect on harvest values for the cash loan. The maize loan, in contrast, had a large and significantly positive 6.7% effect on harvest values in households where she makes decisions compared to maize households in which she does not.

These results present conflicting conclusions. Overall, most of the measures of female bargaining power seem to be associated with larger harvest values in control households. However, in households where the husband is moderately older than the wife, the cash loan had a large positive effect on harvest values, where as in households where the spouse participates in household decision-making, the cash loan had a large negative effect on harvest values. In addition, there is a negative, though not statistically significant, effect of the maize loan in households where the husband is moderately older versus a very significant positive effect of the maize loan in households in which wife participates in household decision making. This is a second, strong piece of evidence suggesting that while both the spouse participating in household decision-making and the age differences between the husband and wife are picking up some sort of dynamic within the household, it is likely not the same one.

7.2.2 Selling Assets

This analysis uses two binary indicators of selling of assets: whether the household sold livestock, and whether it sold household items in the previous four weeks. Typically livestock would sell for a higher price than traditional items found in the household.

In Table 7B, control households seem to sell less livestock when the female spouse does OIGA than when she does not. However, this may, once again, just be reflecting that these households are wealthier and therefore less likely to need to sell assets. No other measures of bargaining power are associated with significant differences in the selling of assets for the control group.

For cash treatment households, however, in Table 7B, those with spouses who did other OIGA were 9 percentage points more likely to sell livestock than treatment households where spouses did not do OIGA. This result is significant at the 10% level. Households in which the

spouse does OIGA that received either loan were less likely to sell a household item, though these results are not significant.

Treatment households, in columns 1 and 2 of Table 8B, in which the husband is moderately older or the wife is older follow a trend of selling fewer livestock than treatment households in which the male is much older, and this is especially true for moderate age difference households that received the cash loan. Specifically, these households are 12.6 percentage points less likely to sell livestock, significant at the 1% level. They were, however, 5.6 percentage points more likely to sell household assets than cash loan recipients where the husband is much older, significant at the 5% level.

Columns 1 and 2 of Panel B in Table 8B show that treatment households in which the female spouse has the same or more education are less likely to sell both livestock and household assets. This effect is especially true for the cash loan, as cash households in which the female has more education were 3.1 percentage points less likely to sell livestock and 6.4 percentage points less likely to sell a household item. The latter result is significant at the 1% level.

Therefore households in which the spouses are closer in age and education that received the cash loan are less likely to sell assets, specifically livestock.

Overall, though, there does not seem to be much significant correlation between the measures of bargaining power and selling of assets, and even the differential effects of the loans are limited. There appears to be no significant relationship between whether the wife participates in household decision-making and asset sales.

The negative correlations between cash treatment households in which the husband and wife are closer in age and selling fewer assets (particularly livestock) may again reflect the differences between low and high bargaining power households with regard to control over the cash. In

households with high levels of female bargaining power, she may be able to exert her preferences on the use of the cash, and thus it is allocated more efficiently for the household, requiring them to sell fewer assets.

However, this does not account for the higher likelihood of treatment high bargaining power households, to sell household items. One hypothesis to explain this pattern might be that women, who are traditionally in control of the interior of the household might have a better idea of the household's assets and which might be beneficial to sell.

7.2.3 Savings

The analysis presented uses one measure of household savings, a binary indicator of whether the household reports having any savings.

Despite observing what seemed to be a possible income effect for other outcomes in the control group with regard to the wife doing OIGA, the measure has no significant relationship to savings in the control group. The only bargaining power measure that has a positive and statistically significant relationship with savings is whether the wife participates in household decision making, significant at the 5% level, in Table 9B. Interestingly, the wife having the same or more education as her husband is very strongly negatively correlated to savings, significant at the 1% level in Panel B of Table 8B.

For treatment households, while cash loan households and maize loan households are 3.8 and 2.8 percentage points more likely to have savings, respectively, in column 3 of Table 7B, there is not much of a differential effect for treatment households in which the female spouse does OIGA.

A similar trend follows in Table 8B panel A, where households that received the cash loan are 4.1 percentage points more likely to have savings, significant at the 5% level, but there appears

to be nearly no, and potentially a negative differential effect of the loans in households where the spouses are closer in age or she is older. The same pattern is true for the maize loan, though none of the results are significant.

Table 9B shows in column 3 that receipt of the cash and maize loan are associated with significant increases of 4.3 percentage points and 3.4 percentage points respectively in the likelihood that the household has any savings as compared to the control group. However, there seems to be almost no differential effect for treatment households in which she makes decisions as compared to treatment households in which she does not.

Over all, the loans seem to be associated with a higher probability of having savings. However, there is not a strong relationship between any of the measures of bargaining and savings, especially in treatment households. The wife participating in household decision making seems to be positively associated with whether the household has savings, and the wife having the same or more education actually seems to be negatively correlated with savings, but neither measure of bargaining power are associated with strong differential effects of the loan. This could potentially be due to the fact that these households are poor and generally do not have huge yearly fluctuations in their savings to begin with. Therefore, preferences for saving may not be entirely relevant in this scenario and, again, bargaining power weights on the utility functions in equation (i) become irrelevant. In addition, it could indicate that potentially preferences for savings are not that different between spouses, and that the issue is again one of efficient resource allocation rather than relative bargaining power.

7.2.4 Luxury consumption

Luxury consumption is defined as the purchase of beer or cigarettes, and the measure used is an indicator variable for whether the household has purchased either of these luxury items in the previous four weeks.

The only female bargaining power measure that is associated with decreased levels of luxury consumption in the control group is whether the wife does OIGA. This result is significant at the 1% level. Potentially this indicates that while there is increased income into the household, the income that she earns she is able to control, or even does not disclose fully to her husband, and chooses not to spend it on luxury items.

However, treatment households in which she does income-generating activities are significantly more likely to have purchased beer or cigarettes in the previous four weeks compared to treatment households in which she does not do OIGA. This effect is very significant for maize treatment households with a spouse who does other OIGA, who are, on average, 13.8 percentage points more likely to have purchased beer or cigarettes in the previous 4 weeks than maize households in which she does not.

In Table 8B, Panel A, Column 4, the results suggest that though both loans seem to have a negative effect on whether the household purchased beer or cigarettes, there appears to be a positive differential effect for treatment households in which the spouses are closer in age or the spouse is older. This is particularly true for maize treatment households in which the husband is moderately older, who are 10.5 percentage points more likely to have purchased beer or cigarettes in the last four weeks compared to maize households in which the husband is much older. Panel B of Table 8B shows no significant effects of spousal educational differences on luxury consumption for treatment households.

Column 4 of Table 9B shows that cash households in which the female spouse does not make household decisions were 2 percentage points more likely to have bought beer or cigarettes in the previous four weeks than control households. However, cash households in which the female spouse does make decisions were 2.1 percentage points less likely to have bought beer or cigarettes in the previous four weeks, thus negating the effect of the cash loan on luxury consumption. These results, however, are not statistically significant.

It seems that receipt of the loan relatively consistently tends to decrease the likelihood that the household bought beer or cigarettes in the previous four weeks. However, the differential effect between treatment households with low levels and high levels of female bargaining power remains unclear. In many circumstances, it appears that treatment households with higher levels of female bargaining power are actually more likely to have consumed luxury goods than treatment households with low levels. This result contradicts the literature and the conceptual framework presented earlier in this paper, which indicate that the wife likely prefers less luxury consumption and so when has more bargaining power in the household, luxury consumption will decrease.

An alternative possibility that might better support these results comes from focus groups with women in these villages. Many reported that some of the households in their village in which the wife had the most decision-making power, were actually ones in which the husband was a drunk. Because he was incapacitated much of the time, the spouse was able to take care of the household relatively autonomously. Perhaps, these results reflect that in households where the female has high levels of bargaining power, she is allowing luxury consumption with the loan to preserve the status quo.

7.3 Results Summary and Adjustments for Multiple Testing

Ultimately, there are some suggestive positive trends for households with higher levels of bargaining power involving consumption and total harvest values.

Across power variables, the age difference between the spouses and the direct measure of whether she participates in household decision making are the measures of female bargaining power that yield the most significant results. They do, however, seem to be picking up different dynamics because the statistically significant results between them are not always consistent. Intuitively, the direct measure should be the strongest measure, because it is generated from responses to direct questions about household decision-making. Age differences may be more engrained into societal norms as an internal symbol of relative power between spouses than educational differences, since in these villages, most people are farmers and grade school education does not have much of an effect on one's ability as a farmer. Finally, OIGA seems to be a weak measure of external resources the female spouse brings to the household. It does not provide any detail of how much she is earning or how often she is participating in these activities, and because it is so general, could be picking up other dynamics within the household.

In addition, potentially for some of these outcome measures, husband and wife preferences are not actually that different, and therefore relative bargaining power does not have much of an effect on these outcomes. Instead, differences in these outcomes reflect their ability to allocate their resources efficiently.

Running this analysis for so many outcome variables might cause us to worry that we are finding falsely statistically significant results. Therefore, I apply the false discovery rate (FDR) adjustment of Benjamini and Hochberg (1995). This process, rather than controlling for the probability of finding one false discovery (such as the standard Bonferonni correction), keeps the

proportion of false discoveries below a threshold (Fink et al. 2014, Anderson 2012). The results for the p-value adjustments can be found in Tables 12 and 13 of Appendix B. As would be expected, fewer results are statistically significant, though the patterns mentioned above still seem to hold true: age difference and household decision making still have a significant differential effect on household consumption and harvest values, mainly through the cash loan.

7.4 Additional Analysis

Since there are many other household characteristics that might affect the way the loans are used in the household, it might be of concern that the differential treatment effects are being driven by some of the factors included in the vector of Baseline covariates, \mathbf{X} . Some of these measures that are correlated with the bargaining power variables may be producing the results rather than the power measures themselves. Therefore, as an extra robustness check, regressions were run to find the baseline covariates that were statistically significantly correlated with each power variable, and then OLS estimations of equation 2 were run including treatment and those Baseline variable interaction terms to control for their potential effect on the treatment. The coefficients on the treatment and power interaction terms with this full set of controls included are presented in Tables 14 and 15 in Appendix B. While the magnitude of some of the coefficients changes, most² are nearly identical in point estimate and statistical significance, suggesting that it is indeed the power variable, and not these Baseline characteristics, that is driving the initial results discussed in section 7.1 and 7.2.

² Some of the differential effects on school attendance are more negative and statistically significant.

8. Conclusion

This study, using experimental data to construct a variety of measures of female bargaining power, yields a number of results that provoke thought and discussion with respect to loan programs and household decision making dynamics.

First, of all the measures created over the course of this analysis, the age difference between husband and wife and the answers to a direct line of questions regarding household decision making seem to be the best proxy measures in terms of producing significant results. However, the two measures may be picking up different dynamics within the household. In addition, the relationship between age difference and relative power is not monotonic.

These patterns are most apparent in the results for household consumption and farm harvest values and were especially significant for households in the cash arm of treatment.

These trends bring about several general conclusions from this analysis. First, the best ways to measure bargaining power may be to directly ask respondents about their decision making process, and to build them, or at least consider them, in relation to societal norms.

Second, the larger results in the cash loan arm suggests that cash loan programs may want to target households in which women have more bargaining power to get the best results from the loans. However, on a deeper level, potentially more programs should be developed to encourage women to have more a voice in their households, to better their well-being even in the absence of a loan program.

The third, and probably biggest, take-away is that bargaining power is an extraordinarily hard phenomenon to measure and analyze. The measures used are not able to capture the true dynamics of the household in many cases. In an ideal experiment, there would be data on how much income the spouse brings into the household, or details about any side business(es) she

might own. The assets she brought to the marriage might be useful information in societies where this factor is engrained into the societal norms, such as in Indonesia which Thomas and Frankenberg (2002) exploited. Still, when trying to quantify human behavior there will always be unobservable occurrences that affect the way we make decisions and interact with others.

Ultimately, dynamics between members of the household, however difficult to measure, play an integral role in determining outcomes for the household, and thus when the aim of policy is to improve household well-being, these factors cannot be ignored.

9. References

- Adato, M., de la Brière, B., Mindek, D. and A., Quisumbing, (2000). Final report: The impact of PROGRESA on women's status and intrahousehold relations. International Food Policy Research Institute Report.
- Aker, J. (2013). Cash or Coupons? Testing the Impacts of Cash versus Vouchers in the Democratic Republic of Congo. Center for Global Development Working Paper 320.
- Anderson, M. (2008). Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects, *Journal of the American Statistical Association*, 103(484), 1481-1495.
- Browning M., F. Bourguignon, P.A. Chiappori and V. Lechene (1994). Income and Outcomes: A Structural Model of Intrahousehold Allocation, *Journal of Political Economy*, 102(6), 1067-1096.
- Browning M., and P.A. Chiappori (1998). Efficient Intra-Household Allocations: A General Characterization and Empirical Tests, *Econometrica*, 66(6), 1241-1278.
- Browning, M., P.A. Chiappori, and Y. Weiss (2014). *Economics of the Family*, Cambridge University Press, Cambridge.
- Chiappori, P.A. (1997). "Collective" Models of Household Behavior: The Sharing Rule Approach. In *Intrahousehold resource allocation in developing countries: Methods, models, and policy*, ed. L. Haddad, J. Hoddinott, and H. Alderman. Baltimore, Md., U.S.A.: Johns Hopkins University Press for the International Food Policy Research Institute.
- Cunha, J. (2012). Testing Paternalism: Cash Versus In-kind Transfers in Rural Mexico. Calhoun Institutional Archive of the Naval Postgraduate School.
- Doss, C. (2013). *Intrahousehold Bargaining and Resource Allocation in Developing Countries*. World Bank Policy Research Working Paper Series 6337.
- Doss, C. (1996). Women's bargaining power in household economic decisions Evidence from Ghana. Staff Paper Series No. P96-11. Department of Applied Economics, College of Agricultural, Food, and Environmental Sciences, University of Minnesota.
- Duflo, E., (2000) Child Health and Household Resources in South Africa: Evidence from the Old Age Pension Program. *American Economic Review*, 90 (2), 393-98.
- Duflo, E., and C. Udry (2004). *Intrahousehold Resource Allocation in Cote d'Ivoire: Social Norms, Separate Accounts and Consumption Choices*, NBER Working Papers 10498. Cambridge, MA: National Bureau of Economic Research.
- Fink, G., K. Jack and F. Masiye (2014). *Seasonal Liquidity Constraints and Agricultural*

Productivity: Evidence from Zambia.

- Fink, G., M. McConnell and S. Vollmer (2014). Testing for heterogeneous treatment effects in experimental data: false discovery risks and correction procedures, *Journal of Development Effectiveness*, 6(1), 44-57.
- Gómez de León, J., and S. Parker (1999). The impact of anti-poverty programs on female labor force participation and women's status: The case of PROGRESA in Mexico. Paper prepared for the 1999 IUSSP Conference on Women and the Labor Market.
- Guyer, J. (1980). Household Budgets and Women's Incomes. Boston University African Studies Center Working Paper No. 28.
- Haddad, L. and J. Hoddinott (1995). Does Female Income Share Influence Household Expenditures? Evidence from Côte D'Ivoire. *Oxford Bulletin of Economics and Statistics*. 57(1), 77-96.
- Haddad, L., J. Hoddinott, and H. Alderman, eds. (1997). Intra-household resource allocation in developing countries: Methods, models, and policy. Baltimore, Md., U.S.A.: Johns Hopkins University Press for the International Food Policy Research Institute.
- Hoddinott, J., S. Sandstrom and J. Upton (2014). The Impact of Cash and Food Transfers: Evidence from a Randomized Intervention in Niger. IFPRI Discussion Paper 01341.
- Lundberg S.J., Pollak R.A. and T.J.Wales, (1997). "Do Husbands and Wives Pool Their Resources? Evidence from the United Kingdom Child Benefit." *Journal of Human Resources*, 32 (3), 463-80.
- Patel, A., W. Leonard, V. Reyes-Garcia, T. McDade, T. Huanca, S. Tanner, and V. Vadez (2007). Parental preference, bargaining power, and child nutritional status: Evidence from the Bolivian Amazon. Tsimane' Amazonian Panel Study Working Paper 31.
- Pitt, M. and S. Khandker (1998). The Impact of Group-Based Credit Programs on Poor Households In Bangladesh: Does the Gender of Participants Matter? *Journal of Political Economy* 106 (5), 958-996.
- Rubalcava, L., Teruel, G., and Thomas, D (2004). "Spending, Saving and Public Transfers Paid to Women." California Center for Population Research, UCLA. Working Paper Series 024-04.
- Rubalcava, L. and D. Thomas, (2000). Family Bargaining and Welfare. RAND Labor and Population Program Working Paper Series 00-10.
- Schultz, T.P., (1990). Testing the Neoclassical Model of Family Labor Supply and Fertility. *Journal of Human Resources*, 25 (4), 599-634.
- Skoufias, E., Unar, M., and T. González-Cossío (2008). The Impacts of Cash and In-Kind

Transfers on Consumption and Labor Supply: Experimental Evidence from Rural Mexico. World Bank Policy Research Working Paper Series 4778.

Thomas, D., (1994). "Like Father, Like Son; Like Mother, Like Daughter." *Journal of Human Resources*, 29 (4), 950-988.

Thomas, D. (1990). Intrahousehold resource allocation: An inferential approach. *Journal of Human Resources* 25 (4), 635-664.

Thomas, D., Frankenburg, E., and D. Contreras (2002), "Distribution of Power within the Household and Child Health," MIMEO, UCLA.

Thomas, D. and C.L. Chen (1993). Income shares and shares of income: Empirical tests of models of household resource allocations. RAND Mimeo Santa Monica, CA: RAND.

Quisumbing, A. and J. Maluccio (2000). Intrahousehold Allocation and Gender Relations: New Empirical Evidence From Four Developing Countries. International Food Policy Research Institute, Food Consumption and Nutrition Division.

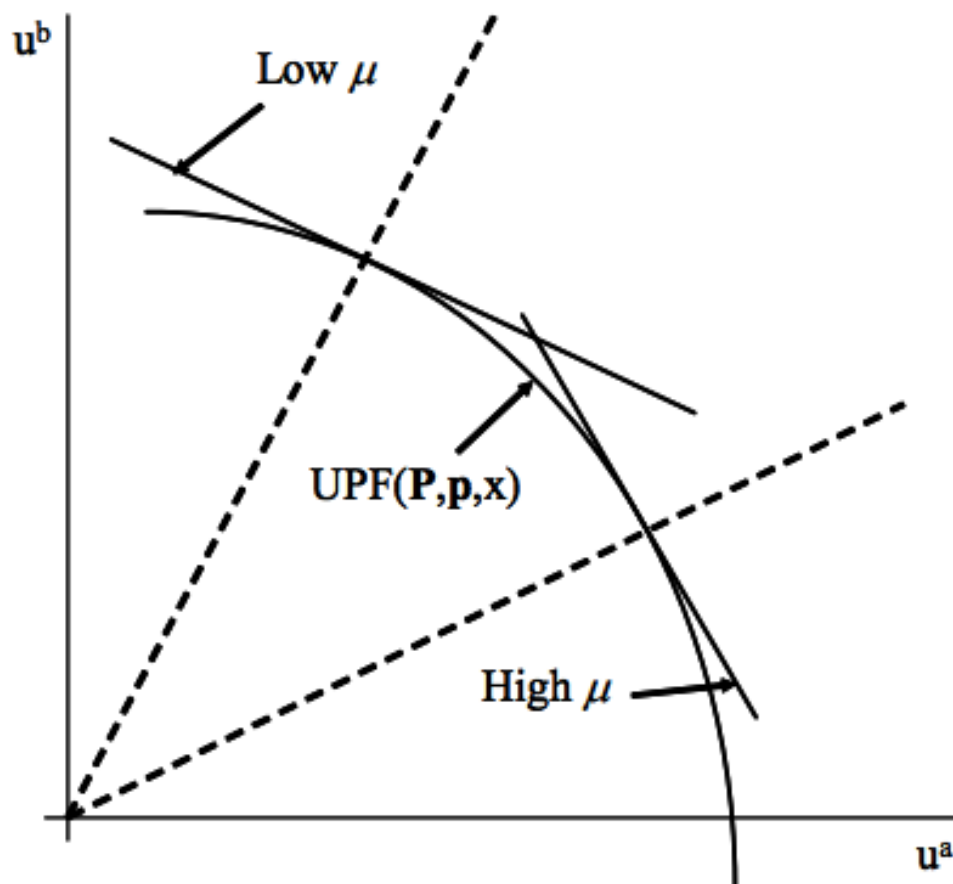


Figure 1. The Utility Possibility Frontier (Browning et al. 2014)

Table 1. Summary Statistics for Bargaining Power Measures

Proxy for Bargaining Power	Mean	Std	Max	Min	N
OIGA	0.183	0.387	1	0	2176
Age Difference (Husband-Wife)	6.198	4.747	33	-24	2143
Education Difference (Husband-Wife)	1.042	3.608	14	-9	2157
Wife has same or more education	0.454	0.498	1	0	2157
Wife Participates in Household Decision Making	0.570	0.495	1	0	2163

Notes: Summary statistics for all bargaining power measures used in analysis. All measured at Baseline with the exception of participation in household decision-making, measured at Harvest.

Table 2A. Summary Statistics for Outcome Measures in Year 1

Outcome	Mean	Std	Max	Min	N
Harvest Value	4102.765	4024.111	38740	0	2165
Nshima Consumption	3.836	0.753	6	0	2993
Protein Consumption	1.298	1.309	6	0	2993
Enough Food	0.469	0.328	1	0	4045
Own Health	3.359	1.026	5	1	2996
Household Status	3.223	0.965	5	1	2163
Luxury Consumption	0.325	0.468	1	0	2992
Savings	0.652	0.476	1	0	4048
Sold Livestock	0.327	0.469	1	0	2994
Sold HH Item	0.091	0.287	1	0	2162
School Attendance	0.575	0.376	1	0	2521

Notes: Complete list of outcome variables by survey round can be found in Table 8.

Table 2B. Summary Statistics for Outcome Measures in Year 2

Outcome	Mean	Std	Max	Min	N
Harvest Value	3883.927	4210.255	43390	0	2148
Nshima Consumption	.	.	.	.	0
Protein Consumption	.	.	.	.	0
Enough Food	0.693	0.382	1	0	3863
Own Health	3.094	1.037	5	1	3132
Household Status	3.138	0.978	5	1	2103
Luxury Consumption	.	.	.	.	0
Savings	0.701	0.457	1	0	3863
Sold Livestock	0.417	0.493	1	0	2103
Sold HH Item	0.102	0.303	1	0	2103
School Attendance	0.628	0.364	1	0	1710

Notes: Complete list of outcome variables by survey round can be found in Table 8.

Table 3. Balance of Baseline Covariates in Year 1

	Control (1)	Cash (2)	Maize (3)	Control vs. Cash (4)	Control vs. Maize (5)	Cash. vs. Maize (6)
Age of HH head	40.205 (0.518)	40.671 (0.539)	40.062 (0.511)	-0.467 (0.748)	0.143 (0.728)	0.610 (0.742)
HH members under 5 years old	1.052 (0.033)	1.098 (0.034)	1.079 (0.035)	-0.047 (0.047)	-0.028 (0.048)	0.019 (0.049)
HH members 5-14	1.878 (0.058)	1.807 (0.058)	1.881 (0.056)	0.071 (0.082)	-0.003 (0.080)	-0.074 (0.080)
HH members 15-64	2.665 (0.044)	2.655 (0.046)	2.631 (0.043)	0.010 (0.064)	0.034 (0.062)	0.024 (0.063)
Members in hh 65+	0.134 (0.016)	0.154 (0.017)	0.126 (0.016)	-0.019 (0.023)	0.009 (0.022)	0.028 (0.023)
HH asset quintile	3.294 (0.050)	3.239 (0.050)	3.167 (0.050)	0.056 (0.071)	0.128* (0.070)	0.072 (0.071)
Total value of livestock KR	4175.60 (246.843)	3780.87 (239.846)	3903.763 (247.442)	394.735 (344.147)	271.841 (349.580)	-122.894 (344.737)
HH did ganyu last yr	0.624 (0.018)	0.654 (0.017)	0.616 (0.018)	-0.029 (0.025)	0.008 (0.025)	0.037 (0.025)
Hired ganyu last season	0.343 (0.018)	0.348 (0.017)	0.349 (0.017)	-0.004 (0.025)	-0.006 (0.025)	-0.001 (0.025)
# of adults working on farm	2.868 (0.049)	2.908 (0.049)	2.849 (0.049)	-0.040 (0.070)	0.019 (0.070)	0.059 (0.069)
Acres of maize	2.495 (0.054)	2.426 (0.051)	2.439 (0.055)	0.069 (0.074)	0.056 (0.077)	-0.013 (0.074)
Acres of cash crops	1.091 (0.041)	1.209 (0.044)	1.298 (0.045)	-0.117* (0.060)	-0.207*** (0.061)	-0.090 (0.063)
Total harvest value in Zambian KR	3514.021 (109.286)	3361.383 (97.767)	3464.814 (105.770)	152.638 (146.581)	49.207 (152.050)	-103.431 (144.143)
Crop diversity index	3.083 (0.042)	3.121 (0.037)	3.159 (0.039)	-0.039 (0.056)	-0.076 (0.058)	-0.038 (0.054)
Total expenditure on inputs last season	612.011 (35.848)	568.818 (58.604)	553.320 (33.375)	43.193 (68.805)	58.691 (48.943)	15.498 (67.125)
N	737	742	756	1479	1493	1498

Notes: All measured at Baseline. Columns 1- 3 present means and standard deviations for each treatment arm in year 1. Columns 4-6 show difference in means between each treatment arm, stars for significant difference in means.

* p<0.10 ** p<0.05 ***p<0.01

Table 4. Balance of Baseline Covariates in Year 2

	Control (1)	Cash (2)	Maize (3)	Control vs. Cash (4)	Control vs. Maize (5)	Cash. vs. Maize (6)
Age of HH head	40.188 (0.422)	40.673 (0.607)	40.231 (0.612)	-0.485 (0.752)	-0.044 (0.751)	0.442 (0.862)
HH members under 5 yrs old	1.050 (0.027)	1.075 (0.040)	1.137 (0.042)	-0.025 (0.048)	-0.087* (0.049)	-0.062 (0.058)
HH members 5-14	1.838 (0.045)	1.807 (0.070)	1.942 (0.068)	0.032 (0.082)	-0.104 (0.081)	-0.135 (0.097)
HH members 15-64	2.620 (0.034)	2.734 (0.056)	2.634 (0.053)	-0.113* (0.063)	-0.014 (0.062)	0.100 (0.077)
HH members 65+	0.149 (0.013)	0.128 (0.019)	0.122 (0.018)	0.021 (0.023)	0.027 (0.023)	0.006 (0.026)
HH asset quintile	3.211 (0.039)	3.305 (0.060)	3.210 (0.060)	-0.094 (0.071)	0.001 (0.071)	0.094 (0.085)
Total value of livestock in KR	3768.898 (200.619)	3999.962 (265.448)	4312.927 (293.468)	-231.063 (349.513)	-544.029 (357.780)	-312.965 (396.165)
HH did ganyu last yr	0.627 (0.014)	0.646 (0.021)	0.627 (0.021)	-0.018 (0.025)	0.000 (0.025)	0.019 (0.030)
Hired ganyu last season	0.336 (0.014)	0.354 (0.021)	0.362 (0.021)	-0.018 (0.025)	-0.026 (0.025)	-0.008 (0.030)
# of adults working on farm	2.876 (0.040)	2.921 (0.058)	2.827 (0.057)	-0.045 (0.071)	0.049 (0.070)	0.094 (0.081)
Acres of maize	2.481 (0.041)	2.353 (0.064)	2.491 (0.067)	0.128* (0.074)	-0.011 (0.075)	-0.139 (0.092)
Acres of cash crops	1.219 (0.035)	1.127 (0.048)	1.231 (0.053)	0.092 (0.061)	-0.012 (0.063)	-0.104 (0.072)
Total harvest value in Zambian KR	3482.484 (81.920)	3436.795 (133.143)	3377.024 (118.247)	45.689 (151.695)	105.460 (145.566)	59.771 (177.888)
Crop diversity index	3.160 (0.033)	3.052 (0.044)	3.103 (0.046)	0.108* (0.057)	0.057 (0.058)	-0.052 (0.063)
Total expenditure on inputs used last season	562.136 (26.477)	645.374 (82.743)	546.377 (36.709)	-83.237 (67.909)	15.759 (46.484)	98.996 (89.894)
N	1180	522	533	1702	1713	1055

Notes: All measured at Baseline. Columns 1- 3 present means and standard deviations for each treatment arm in year 2. Columns 4-6 show difference in means between each treatment arm, stars for significant difference in means. Standard deviations in parenthesis. * p<0.10 ** p<0.05 ***p<0.01

Table 5. Balance in Power Variables Across Treatments

Year 1						
	Control (1)	Cash (2)	Maize (3)	Control vs. Cash (4)	Control vs. Maize (5)	Cash. vs. Maize (6)
Groundnuts	0.518 (0.019)	0.552 (0.018)	0.491 (0.018)	-0.034 (0.026)	0.027 (0.026)	0.061** (0.026)
IGA	0.184 (0.014)	0.189 (0.015)	0.179 (0.014)	-0.006 (0.021)	0.005 (0.020)	0.011 (0.020)
Age difference (Husband-Wife)	6.328 (0.167)	6.278 (0.194)	5.993 (0.170)	0.050 (0.256)	0.335 (0.239)	0.285 (0.258)
Educ difference (H-W)	0.464 (0.019)	0.448 (0.019)	0.450 (0.018)	0.016 (0.026)	0.013 (0.026)	-0.003 (0.026)
Wife responded to one or more surveys	0.173 (0.014)	0.163 (0.014)	0.164 (0.014)	0.010 (0.020)	0.009 (0.019)	-0.001 (0.019)
Spouse participates in household decision making	0.562 (0.019)	0.572 (0.018)	0.576 (0.018)	-0.010 (0.026)	-0.014 (0.026)	-0.003 (0.026)
N	737	742	756	1479	1493	1498
Year 2						
	Control (1)	Cash (2)	Maize (3)	Control vs. Cash (4)	Control vs. Maize (5)	Cash. vs. Maize (6)
Groundnuts	0.512 (0.015)	0.561 (0.022)	0.499 (0.022)	-0.048* (0.026)	0.013 (0.026)	0.062** (0.031)
IGA	0.185 (0.011)	0.190 (0.017)	0.174 (0.017)	-0.005 (0.021)	0.011 (0.020)	0.016 (0.024)
Age difference (Husband-Wife)	6.229 (0.142)	6.201 (0.212)	6.127 (0.208)	0.028 (0.256)	0.102 (0.253)	0.074 (0.297)
Educ difference (H-W)	0.456 (0.015)	0.451 (0.022)	0.452 (0.022)	0.005 (0.027)	0.004 (0.027)	-0.001 (0.031)
Wife responded to one or more surveys	0.167 (0.011)	0.159 (0.016)	0.173 (0.016)	0.008 (0.020)	-0.006 (0.020)	-0.014 (0.023)
Spouse participates in household decision making	0.576 (0.015)	0.552 (0.022)	0.575 (0.022)	0.024 (0.027)	0.001 (0.026)	-0.023 (0.031)
N	1180	522	533	1702	1713	1055

Notes: Columns 1- 3 present means and standard deviations for each treatment arm in years 1 and 2. Columns 4-6 show difference in means between each treatment arm, stars for significant difference in means. * p<0.10 ** p<0.05 ***p<0.01

Table 6. Attrition Across Treatment Arms

Treatment Assignment	Year 1			Year 2		
	Interviewed (1)	Not Interviewed (2)	Total (3)	Interviewed (4)	Not Interviewed (5)	Total (6)
Control	710 97.39%	19 2.61%	729	1,098 94.33%	66 5.67%	1,164
Cash	720 97.96%	15 2.04%	735	491 95.53%	23 4.47%	514
Maize	733 97.60%	18 2.40%	751	503 95.27%	114 4.73%	528
Total	2,163 97.65%	52 2.35%	2,215	2,092 94.83%	114 5.17%	2,206

Notes: Columns 1-2 show number of observations and share of total observations interviewed in each treatment arm in year 1, columns 4-5 for year 2.

Table 7A. Treatment and External Power Measures' Impact on Individual Well Being

	Consumption		Health			
	Nshima (1)	Protein (2)	Enough Food (3)	Own Health (4)	Household Status (5)	School Attendance (6)
Cash	0.048 (0.044)	-0.027 (0.083)	0.018* (0.009)	0.095** (0.041)	0.115*** (0.039)	-0.015 (0.017)
Maize	0.116*** (0.045)	-0.012 (0.096)	0.034*** (0.010)	0.053 (0.044)	0.093** (0.046)	0.001 (0.016)
Does IGA	0.010 (0.069)	-0.016 (0.086)	0.022** (0.009)	0.143*** (0.047)	0.109*** (0.040)	0.013 (0.012)
Cash*IGA	-0.097 (0.084)	0.174 (0.132)	-0.028* (0.015)	-0.182** (0.075)	-0.025 (0.071)	-0.018 (0.027)
Maize*IGA	0.021 (0.102)	0.223 (0.177)	-0.030* (0.016)	-0.056 (0.080)	-0.102 (0.062)	-0.048* (0.025)
Observations	2941	2941	7769	8178	6348	5748
Cntrl Mean Y1	3.783	1.293	0.464	3.317	3.165	0.592
Cntrl Mean Y2	.	.	0.673	3.070	3.096	0.641
Baseline Mean	.	.	.	3.262	3.179	0.552

Notes: OLS regressions (equation 2) of individual well-being outcomes on treatment and IGA dummies. All standard errors clustered at the village level. Control and baseline means shown when available. *p<0.10 **p<0.05 ***p<0.01

Table 7B. Treatment and External Power Measures' Impact on Household Well-Being

	Cash Flow			Harvest Value (ZKW)		
	Sold Livestock (1)	Sold HH Item (2)	Savings (3)	Bought Beer/Cigs (4)	Total Value (5)	Log Total Value (6)
Cash	-0.023 (0.024)	-0.001 (0.012)	0.038** (0.016)	0.003 (0.029)	126.939 (198.521)	0.038 (0.045)
Maize	0.010 (0.026)	0.001 (0.014)	0.028* (0.015)	-0.048* (0.029)	8.311 (162.516)	0.006 (0.045)
Did IGA	-0.056* (0.030)	0.024 (0.021)	-0.005 (0.015)	-0.124*** (0.041)	-175.198** (86.806)	-0.065** (0.033)
Cash*IGA	0.089* (0.045)	-0.032 (0.029)	0.001 (0.034)	0.047 (0.055)	143.565 (265.635)	0.021 (0.067)
Maize*IGA	0.068 (0.047)	-0.032 (0.032)	0.043 (0.034)	0.138** (0.065)	286.283 (271.362)	0.054 (0.063)
Observations	4187	4187	9944	2940	6408	6387
Cntrl Mean Y1	0.313	0.094	0.635	0.323	4129.641	7.936
Cntrl Mean Y2	0.413	0.101	0.678	.	3814.403	7.878
Baseline Mean	.	.	0.669	.	3442.391	7.848

Notes: OLS regressions (equation 2) of household well-being outcomes on treatment and IGA dummies. All standard errors clustered at the village level. Control and baseline means presented when available. *p<0.10 **p<0.05 ***p<0.01

Table 8A. Treatment and Internal Power Measures' Impact on Individual Well-Being

	Consumption			Health		
	Nshima (1)	Protein (2)	Enough Food (3)	Own Health (4)	Household Status (5)	School Attendance (6)
<i>A. Age Difference</i>						
Cash	-0.003 (0.065)	-0.221** (0.110)	0.003 (0.013)	0.025 (0.057)	0.115** (0.049)	-0.001 (0.018)
Maize	0.122* (0.068)	-0.088 (0.125)	0.014 (0.013)	0.091* (0.054)	0.083 (0.057)	0.014 (0.021)
Husband is moderately older	-0.002 (0.068)	-0.188* (0.099)	-0.003 (0.009)	0.058 (0.037)	0.049 (0.035)	-0.002 (0.011)
Wife is close in age or older	-0.049 (0.056)	-0.213* (0.109)	-0.005 (0.010)	0.023 (0.040)	0.049 (0.038)	0.011 (0.010)
Cash*Husband	-0.019 (0.085)	0.396*** (0.142)	0.017 (0.014)	0.026 (0.072)	-0.030 (0.065)	-0.017 (0.027)
Cash*Wife	0.114 (0.085)	0.316** (0.149)	0.013 (0.015)	0.077 (0.084)	-0.032 (0.079)	-0.041 (0.026)
Maize*Husband	-0.027 (0.094)	0.170 (0.150)	0.033** (0.015)	-0.079 (0.064)	0.032 (0.082)	-0.024 (0.028)
Maize*Wife	0.028 (0.081)	0.223 (0.155)	0.018 (0.013)	-0.062 (0.069)	-0.077 (0.074)	-0.043* (0.024)
Observations	2896	2896	7649	8059	6255	5674
<i>B. Education Difference</i>						
Cash	-0.033 (0.052)	-0.090 (0.102)	0.014 (0.010)	0.052 (0.045)	0.143*** (0.041)	0.002 (0.017)
Maize	0.081 (0.054)	0.019 (0.118)	0.031*** (0.011)	0.057 (0.051)	0.087* (0.050)	-0.012 (0.017)
Spouse has the same or more ed	-0.059 (0.045)	-0.040 (0.082)	0.010 (0.008)	-0.008 (0.029)	0.005 (0.029)	0.001 (0.008)
Cash*Ed	0.133** (0.066)	0.206* (0.115)	-0.004 (0.011)	0.013 (0.050)	-0.072 (0.054)	-0.045* (0.023)
Maize*Ed	0.078 (0.069)	0.008 (0.133)	-0.002 (0.012)	-0.030 (0.055)	-0.023 (0.069)	0.010 (0.023)
Observations	2915	2915	7692	8100	6292	5695
Cntrl Mean Y1	3.783	1.293	0.464	3.317	3.165	0.592
Cntrl Mean Y2	.	.	0.673	3.070	3.096	0.641
Baseline Mean	.	.	.	3.262	3.179	0.552

Notes: Panel A shows OLS regressions (equation 2) of individual well-being outcomes on treatment and age difference categorical dummies. Panel B shows OLS regressions (equation 2) of individual well-being outcomes on treatment and educational difference dummies. All standard errors clustered at the village level. Control and baseline means presented when available. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

Table 8B. Treatment and Internal Power Measures' Impact on Household Well-Being

	Cash Flow			Harvest Value (ZKW)		
	Sold Livestock (1)	Sold HH Item (2)	Savings (3)	Bought Beer/Cigs (4)	Total Value (6)	Log Total Value (7)
<i>A. Age Difference</i>						
Cash	0.031 (0.033)	-0.016 (0.016)	0.041** (0.019)	-0.010 (0.041)	-299.717* (173.098)	-0.021 (0.047)
Maize	0.029 (0.030)	-0.030* (0.016)	0.028 (0.021)	-0.077* (0.040)	96.467 (196.978)	-0.000 (0.052)
Husband is moderately older	0.050 (0.031)	-0.014 (0.016)	0.007 (0.012)	-0.051 (0.036)	50.702 (93.108)	0.033 (0.025)
Wife is close in age or older	-0.032 (0.031)	-0.013 (0.019)	-0.015 (0.013)	0.031 (0.045)	18.151 (94.479)	0.009 (0.026)
Cash*Husband	-0.126*** (0.045)	0.056** (0.025)	-0.021 (0.030)	0.062 (0.052)	930.182*** (290.826)	0.128** (0.059)
Cash*Wife	-0.000 (0.047)	-0.022 (0.026)	-0.001 (0.031)	-0.011 (0.055)	396.167* (238.166)	0.042 (0.059)
Maize*Husband	-0.021 (0.042)	0.014 (0.024)	-0.014 (0.030)	0.105** (0.050)	-240.040 (229.635)	0.020 (0.054)
Maize*Wife	-0.003 (0.041)	0.069** (0.029)	0.033 (0.029)	0.058 (0.056)	100.124 (281.242)	0.028 (0.049)
Observations	4122	4122	9791	2895	6310	6289
<i>B. Education Difference</i>						
Cash	0.006 (0.028)	0.024 (0.017)	0.039* (0.020)	-0.013 (0.034)	233.373 (245.284)	0.055 (0.052)
Maize	0.025 (0.027)	0.004 (0.018)	0.022 (0.017)	-0.025 (0.034)	-21.427 (180.713)	0.002 (0.049)
Spouse has the same or more ed	0.007 (0.023)	0.011 (0.015)	-0.028*** (0.010)	-0.031 (0.031)	-10.443 (79.251)	0.020 (0.020)
Cash*Ed	-0.031 (0.036)	-0.064*** (0.023)	-0.008 (0.030)	0.050 (0.044)	-237.724 (212.493)	-0.042 (0.048)
Maize*Ed	-0.006 (0.037)	-0.017 (0.024)	0.024 (0.021)	0.008 (0.045)	170.132 (237.639)	0.024 (0.054)
Observations	4150	4150	9848	2913	6351	6330
Cntrl Mean Y1	0.313	0.094	0.635	0.323	4129.641	7.936
Cntrl Mean Y2	0.413	0.101	0.678	.	3814.403	7.878
Baseline Mean	.	.	0.669	.	3442.391	7.848

Notes: Panel A shows OLS regressions (equation 2) of household well-being outcomes on treatment and age difference categorical dummies. Panel B shows OLS regressions (equation 2) of household well-being outcomes on treatment and educational difference dummies. All standard errors clustered at the village level. Control and baseline means presented when available. *p<0.10 **p<0.05 ***p<0.01

Table 9A. Treatment and Direct Power Measures' Impact on Individual Well-Being

	Consumption			Health		
	Nshima (1)	Protein (2)	Enough Food (3)	Own Health (4)	Household Status (5)	School Attendance (5)
Cash	0.011 (0.060)	-0.049 (0.100)	0.005 (0.011)	0.074 (0.052)	0.088* (0.049)	-0.048** (0.019)
Maize	0.161** (0.062)	-0.066 (0.111)	0.027** (0.012)	0.000 (0.054)	0.040 (0.057)	-0.019 (0.019)
Spouse participates	0.191*** (0.048)	0.121 (0.091)	0.014** (0.007)	0.052* (0.031)	0.096*** (0.031)	0.012 (0.009)
Cash*Participates	0.018 (0.071)	0.080 (0.122)	0.013 (0.012)	-0.016 (0.054)	0.056 (0.058)	0.043** (0.021)
Maize*Participates	-0.071 (0.068)	0.169 (0.130)	0.003 (0.012)	0.082 (0.062)	0.062 (0.064)	0.023 (0.019)
Observations	2973	2973	7798	8191	6367	5746
Cntrl Mean Y1	3.783	1.293	0.464	3.317	3.165	0.592
Cntrl Mean Y2	.	.	0.673	3.070	3.096	0.641
Baseline Mean	.	.	.	3.262	3.179	0.552

Notes: OLS regressions (equation 2) of individual well-being outcomes on treatment and participation in household decision making dummies. All standard errors clustered at the village level. Control and baseline means presented when available. *p<0.10 **p<0.05 ***p<0.01

Table 9B. Treatment and Direct Power Measures' Impact on Household Well-Being

	Cash Flow			Harvest Value (ZKW)		
	Sold Livestock (1)	Sold HH Item (2)	Savings (3)	Bought Beer/Cigs (4)	Total Value (6)	Log Total Value (7)
Cash	-0.006 (0.029)	-0.006 (0.015)	0.043** (0.022)	0.020 (0.040)	414.283* (218.601)	0.078 (0.051)
Maize	0.002 (0.030)	-0.002 (0.016)	0.034* (0.020)	-0.030 (0.039)	-265.943* (152.140)	-0.027 (0.054)
Spouse participates	0.017 (0.021)	0.014 (0.015)	0.030** (0.012)	0.029 (0.036)	335.650*** (76.348)	0.105*** (0.021)
Cash*Participates	-0.008 (0.032)	-0.004 (0.023)	-0.002 (0.024)	-0.021 (0.052)	-463.335** (222.525)	-0.058 (0.055)
Maize*Participates	0.033 (0.034)	-0.009 (0.021)	0.000 (0.022)	0.010 (0.049)	512.868*** (196.661)	0.067 (0.048)
Observations	4220	4220	9960	2972	6427	6408
Cntrl Mean Y1	0.313	0.094	0.635	0.323	4129.641	7.936
Cntrl Mean Y2	0.413	0.101	0.678	.	3814.403	7.878
Baseline Mean	.	.	0.669	.	3442.391	7.848

Notes: OLS regressions (equation 2) of household well-being outcomes on treatment and participation in household decision making dummies. All standard errors clustered at the village level. Control and baseline means presented when available. *p<0.10 **p<0.05 ***p<0.01

Table 10. Overview of Outcome Variables By Survey Round and Year

Variable	Description	Survey Round(s)	Year(s)
Bought beer or cigarettes	Member of HH bought beer or cigarettes in the past four weeks	Midline, Harvest	2014
Enough Food	Ratio of months of the year HH had enough food	Midline, Harvest, Labor R1-R4, Endline	2014, 2015
Household Status	Respondent's evaluation of household well-being over last 6 months on a scale of 1-5	Baseline, Harvest, Endline	2013, 2014, 2015
Nshima	Average HH member consumption of nshima in past two days	Midline, Harvest	2014
Own Health	Respondent's evaluation of their own health on a scale of 1-5	Baseline, Midline, Harvest, Labor R3, Endline	2013, 2014, 2015
Protein	Average HH member consumption of protein in past two days	Midline, Harvest	2014
Savings	Household reported having savings	Baseline, Midline, Harvest, Labor R1-R4, Endline (All Rounds)	2013, 2014, 2015
School Attendance	Ratio of number of school age children in HH attending school	Baseline, Midline, Harvest, Endline	2013, 2014, 2015
Sold HH Item	Sold a household item in the last four weeks	Harvest, Endline	2014, 2015
Sold Livestock	Sold any livestock in the last four weeks	Midline, Harvest, Endline	2014, 2015
Value in ZKW	Total Harvest Value in ZKW	Baseline, Harvest, Endline	2013, 2014, 2015

Appendix A: Harvest Survey Questions

Decision Making

1. *Who makes decisions about general household purchases?*
2. *Who makes decisions about food purchases?*
3. *Who makes decisions about school supply purchases and allocation of money for education?*
4. *In the last 4 weeks, who in your household, if anyone, has purchased clothes or chitenjes?*
5. *In the last 4 weeks, who in your household, if anyone, has purchased meat?*
6. *In the last 4 weeks, who in your household, if anyone, has purchased airtime?*

Appendix B: Additional Analysis

Table 11. Results for Harvest Values at Constant Prices

	Total Harvest Value at CP	Log of Total Harvest Value at CP
IGA	-63.361 (83.161)	-0.054* (0.030)
IGA*Cash	25.870 (231.956)	0.027 (0.059)
IGA*Maize	-47.921 (232.435)	0.015 (0.057)
Husband is moderately older	-9.832 (80.444)	0.019 (0.023)
Wife is within 3 yrs or older	24.483 (83.632)	0.012 (0.024)
Husband*Cash	688.131*** (258.676)	0.090 (0.056)
Wife*Cash	343.618 (228.894)	0.050 (0.056)
Husband*Maize	-118.957 (228.105)	0.041 (0.051)
Wife*Maize	166.666 (268.137)	0.018 (0.050)
Female has same or more educ	-33.159 (72.706)	0.017 (0.019)
Educ*Cash	-166.980 (190.704)	-0.046 (0.044)
Educ*Maize	198.977 (216.364)	0.023 (0.051)
Spouse participates in hh decision making	329.637*** (71.295)	0.102*** (0.020)
Participates*Cash	-377.479* (213.744)	-0.045 (0.053)
Participates*Maize	343.137* (189.877)	0.030 (0.044)
Cntrl Mean Y1	4215.093	8.002
Cntrl Mean Y2	3691.857	7.880
Baseline Mean	3918.340	8.008

Notes: OLS regressions (equation 2) of household well-being outcomes on treatment and household decision making dummies. Coefficients on each power variable and treatment interaction terms presented. All standard errors clustered at the village level. Control and baseline means presented when available. *p<0.10 **p<0.05 ***p<0.01

Table 12. P-Value Adjustments for Multiple Inferences on Individual Outcomes

	Nshima	Protein	Enough Food	Own Health	HH Status	School Attendance
<i>IGA</i>						
Cash	-0.097 (0.084)	0.174 (0.132)	-0.028* (0.015)	-0.182** (0.075)	-0.097 (0.084)	-0.018 (0.027)
FDR			NO	NO		
Maize	0.021 (0.102)	0.223 (0.177)	-0.030* (0.016)	-0.056 (0.080)	0.021 (0.102)	-0.048* (0.025)
FDR			NO			NO
<i>Husband is moderately older</i>						
Cash	-0.019 (0.085)	0.396*** (0.142)	0.017 (0.014)	0.026 (0.072)	-0.030 (0.065)	-0.017 (0.027)
FDR		YES				
Maize	-0.027 (0.094)	0.170 (0.150)	0.033** (0.015)	-0.079 (0.064)	0.032 (0.082)	-0.024 (0.028)
FDR			NO			
<i>Wife is within 3 years or older</i>						
Cash	0.114 (0.085)	0.316** (0.149)	0.013 (0.015)	0.077 (0.084)	-0.032 (0.079)	-0.041 (0.026)
FDR		NO				
Maize	0.028 (0.081)	0.223 (0.155)	0.018 (0.013)	-0.062 (0.069)	-0.077 (0.074)	-0.043* (0.024)
FDR						NO
<i>Education</i>						
Cash	0.133** (0.066)	0.206* (0.115)	-0.004 (0.011)	0.013 (0.050)	-0.072 (0.054)	-0.045* (0.023)
FDR	NO	NO				NO
Maize	0.078 (0.069)	0.008 (0.133)	-0.002 (0.012)	-0.030 (0.055)	-0.023 (0.069)	0.010 (0.023)
FDR						
<i>Participation</i>						
Cash	0.018 (0.071)	0.080 (0.122)	0.013 (0.012)	-0.016 (0.054)	0.056 (0.058)	0.043** (0.021)
FDR						NO
Maize	-0.071 (0.068)	0.169 (0.130)	0.003 (0.012)	0.082 (0.062)	0.062 (0.064)	0.023 (0.019)

Notes: Table 10 presents OLS interaction term coefficients from section 7 with standard errors in parenthesis, with stars indicating original significance. FDR row indicates whether result is still significant after False Discovery Rate Adjustment (Fink et. al 2014).

Table 13. P-Value Adjustments for Multiple Inferences on Household Outcomes

	Sold Livestock	Sold HH Asset	Savings	Bought Beer/Cigs	Harvest Value	Log Harvest Value
<i>IGA</i>						
Cash	0.089* (0.045)	-0.032 (0.029)	0.001 (0.034)	0.047 (0.055)	143.565 (265.635)	0.021 (0.067)
FDR	NO					
Maize	0.068 (0.047)	-0.032 (0.032)	0.043 (0.034)	0.138** (0.065)	286.283 (271.362)	0.054 (0.063)
FDR	NO					
<i>Husband is moderately older</i>						
Cash	-0.126*** (0.045)	0.056** (0.025)	-0.021 (0.030)	0.062 (0.052)	930.182*** (290.826)	0.128** (0.059)
FDR	YES	NO			YES	NO
Maize	-0.021 (0.042)	0.014 (0.024)	-0.014 (0.030)	0.105** (0.050)	-240.040 (229.635)	0.020 (0.054)
FDR	NO					
<i>Wife is within 3 years or older</i>						
Cash	-0.000 (0.047)	-0.022 (0.026)	-0.001 (0.031)	-0.011 (0.055)	396.167* (238.166)	0.042 (0.059)
FDR	NO					
Maize	-0.003 (0.041)	0.069** (0.029)	0.033 (0.029)	0.058 (0.056)	100.124 (281.242)	0.028 (0.049)
FDR	NO					
<i>Education</i>						
Cash	-0.031 (0.036)	-0.064*** (0.023)	-0.008 (0.030)	0.050 (0.044)	-237.724 (212.493)	-0.042 (0.048)
FDR	YES					
Maize	-0.006 (0.037)	-0.017 (0.024)	0.024 (0.021)	0.008 (0.045)	170.132 (237.639)	0.024 (0.054)
FDR	NO					
<i>Participation</i>						
Cash	-0.008 (0.032)	-0.004 (0.023)	-0.002 (0.024)	-0.021 (0.052)	-463.335** (222.525)	-0.058 (0.055)
FDR	NO					
Maize	0.033 (0.034)	-0.009 (0.021)	0.000 (0.022)	0.010 (0.049)	512.868*** (196.661)	0.067 (0.048)
FDR	YES					

Notes: Table 11 presents OLS interaction term coefficients from section 7 with standard errors in parenthesis, with stars indicating original significance. FDR row indicates whether result is still significant after False Discovery Rate Adjustment (Fink et. al 2014).

Table 14. Results with Treatment and Control Interactions on Individual Outcomes

	Nshima	Protein	Enough Food	Own Health	HH Status	School Attendance
<i>IGA</i>						
Cash	-0.067 (0.089)	0.112 (0.146)	-0.026 (0.016)	-0.190** (0.078)	-0.057 (0.085)	-0.035 (0.024)
Maize	0.025 (0.110)	0.319* (0.186)	-0.036** (0.017)	-0.062 (0.086)	-0.104 (0.071)	-0.078*** (0.026)
<i>Husband is moderately older</i>						
Cash	-0.029 (0.093)	0.387*** (0.147)	0.017 (0.015)	0.033 (0.077)	0.017 (0.067)	-0.037 (0.030)
Maize	-0.041 (0.105)	0.169 (0.155)	0.033** (0.016)	-0.032 (0.064)	0.053 (0.092)	-0.019 (0.029)
<i>Wife is within 3 years or older</i>						
Cash	0.102 (0.095)	0.282* (0.159)	0.016 (0.016)	0.095 (0.096)	0.041 (0.088)	-0.071*** (0.026)
Maize	0.014 (0.090)	0.236 (0.162)	0.019 (0.015)	-0.006 (0.073)	-0.046 (0.087)	-0.039 (0.026)
<i>Education</i>						
Cash	0.128* (0.067)	-0.040 (0.049)	-0.004 (0.011)	0.021 (0.052)	-0.052 (0.056)	-0.052** (0.023)
Maize	0.065 (0.072)	0.027 (0.053)	-0.006 (0.012)	-0.019 (0.056)	-0.004 (0.069)	0.006 (0.023)
<i>Participation</i>						
Cash	0.030 (0.072)	0.189 (0.116)	-0.004 (0.011)	0.021 (0.052)	-0.052 (0.056)	0.039* (0.021)
Maize	-0.074 (0.071)	-0.004 (0.137)	-0.006 (0.012)	-0.019 (0.056)	-0.004 (0.069)	0.016 (0.019)
Cntrl Mean Y1	3.783	1.293	0.464	3.317	3.165	0.592
Cntrl Mean Y2	.	.	0.673	3.070	3.096	0.641
Baseline Mean	.	.	.	3.262	3.179	0.552

Notes: OLS regressions (equation 2) of individual well-being outcomes on treatment and household decision making dummies, as well as treatment and baseline control interactions. Coefficients on each power variable and treatment interaction terms presented. All standard errors clustered at the village level.
*p<0.10 **p<0.05 ***p<0.01

Table 15. Results with Treatment and Control Interactions on Household Outcomes

	Sold Livestock	Sold HH Asset	Savings	Bought Beer/Cigs	Harvest Value	Log Harvest Value
<i>IGA</i>						
Cash	0.082* (0.047)	-0.028 (0.028)	-0.006 (0.035)	0.057 (0.057)	146.141 (257.666)	-0.000 (0.067)
Maize	0.070 (0.052)	-0.009 (0.034)	0.054 (0.038)	0.153** (0.069)	268.888 (251.700)	0.053 (0.064)
<i>Husband is moderately older</i>						
Cash	-0.133*** (0.045)	0.067*** (0.025)	-0.032 (0.031)	0.058 (0.055)	795.865*** (269.191)	0.093* (0.056)
Maize	-0.033 (0.047)	0.024 (0.024)	-0.027 (0.034)	0.115** (0.053)	-211.034 (202.509)	0.056 (0.050)
<i>Wife is within 3 years or older</i>						
Cash	-0.009 (0.049)	-0.007 (0.029)	-0.020 (0.032)	-0.013 (0.061)	185.363 (253.117)	0.047 (0.058)
Maize	-0.008 (0.047)	0.079** (0.034)	0.011 (0.035)	0.056 (0.061)	81.195 (252.090)	0.025 (0.048)
<i>Education</i>						
Cash	-0.022 (0.036)	-0.064*** (0.023)	-0.008 (0.030)	0.049 (0.045)	-240.247 (207.363)	-0.040 (0.049)
Maize	0.001 (0.037)	-0.018 (0.024)	0.021 (0.022)	0.013 (0.046)	157.464 (230.996)	0.027 (0.053)
<i>Participation</i>						
Cash	-0.018 (0.033)	-0.005 (0.023)	-0.002 (0.025)	-0.017 (0.053)	-553.104** (219.039)	-0.056 (0.052)
Maize	0.040 (0.033)	-0.005 (0.021)	0.006 (0.023)	0.011 (0.051)	488.227** (187.661)	0.069 (0.047)
Cntrl Mean Y1	0.313	0.094	0.635	0.323	4129.641	7.936
Cntrl Mean Y2	0.413	0.101	0.678	.	3814.403	7.878
Baseline Mean	.	.	0.669	.	3442.391	7.848

Notes: OLS regressions (equation 2) of individual well-being outcomes on treatment and household decision-making dummies, as well as treatment and baseline control interactions. Coefficients on each power variable and treatment interaction terms presented. All standard errors clustered at the village level.
*p<0.10 **p<0.05 ***p<0.01

Table 16. Results for School Attendance with Child Age 6-16 years old

	School Attendance (ages 6-16)
IGA	0.016 (0.011)
IGA*Cash	-0.009 (0.031)
IGA*Maize	-0.041 (0.031)
Husband is moderately older	-0.002 (0.011)
Wife is within 3 yrs or older	0.003 (0.011)
Husband*Cash	-0.010 (0.027)
Wife*Cash	-0.023 (0.032)
Husband*Maize	-0.026 (0.029)
Wife*Maize	-0.026 (0.029)
Female has same or more educ	-0.004 (0.007)
Educ*Cash	-0.052** (0.026)
Educ*Maize	0.005 (0.025)
Spouse participates in hh decision making	0.008
Participates*Cash	(0.009) 0.048**
Participates*Maize	(0.024) 0.017
Cntrl Mean Y1	0.680
Cntrl Mean Y2	0.697
Baseline Mean	0.647

Notes: OLS regressions (equation 2) school attendance, redefined for ages 6-16 years old, on treatment and household decision-making dummies. Standard errors clustered at village level.
*p<0.10 **p<0.05 ***p<0.01