Aid and Agency in Africa: Explaining Food Disbursements Across Ethiopian Households in the Nineties.

Nzinga Broussard*, Stefan Dercon†, and Rohini Somanathan‡

September 19, 2007

Abstract

There is a large literature which examines the targeting of food aid in Sub-Saharan Africa, and in particular, Ethiopia where large fractions of the population suffer from acute food shortages. Regional targeting appears faulty. At the household level, most studies agree that *Food for Work* programs reach primarily poor households while *Free Distribution* does only marginally better, on average, than a random allocation of aid across households. This paper examines the pattern of household targeting for free food disbursements using a principal agent model. The model predicts a positive relationship between aid disbursements and unobservable components of wealth correlated with power or influence. We find some preliminary evidence that the predictions of the model are consistent with household data on aid receipts. Households which are powerful receive more aid when they experience idiosyncratic crop shocks while households with more livestock receive less aid.

*Department of Economics, University of Michigan, nbroussa@umich.edu.
†University of Oxford, Stefan.Dercon@economics.ox.ac.uk
‡Delhi School of Economics, University of Delhi, rohini@cdedse.org

Contents

1 Introduction

African aid has been getting a lot of attention. Heated debates center around whether more aid to countries in Sub-Saharan Africa is a solution to the acute poverty and malnutrition in the region. Central to answering this question is an understanding of how existing allocations of food aid are distributed across households and the effects these disbursements have on important household characteristics such as agricultural productivity and child nutrition.

In this paper we examine distributions of food aid across rural Ethiopian households. There is a sizable literature which points to mis-targeting of aid allocations and our primary goal is to investigate systematic influences on the distribution of such aid. There is evidence of poor targeting on the part of donors, [Barrett, 2001, Shapouri and Missiaen, 1990, Zahariadis and Ward, 2000] and within regions, [Jayne et al., 2002, Clay et al., 1999]. Most of the studies that have looked at food aid distributions find little to no relationship between aid allocations and pre-aid income/consumption [Jayne et al., 2002, Clay et al., 1999]. This paper examines the pattern of household targeting for free food disbursements using a principal agent model. The model predicts a positive relationship between aid disbursements and unobservable components of wealth correlated with power or influence. We find some preliminary evidence that the predictions of the model are consistent with household data on aid receipts.

We investigate closely the distributions of free aid as opposed to food-for-work. At the household level, most studies agree that *Food for Work* programs reach primarily poor households while *Free Distribution* does only marginally better, on average, than a random allocation of aid across households [Clay et al., 1999, Quisumbing, 2003]. But because so little is known about the decision rules in determining who receives aid, most of these recent papers have been unable to answer why such aid allocations exists[1]. The idea of this paper is to document these findings and examine whether they are consistent with a model in which benevolent administrators at higher levels attempt to control agency problems in distributions at lower levels of the chain of distribution.

A principal-agent model is ideal for explaining the observed findings of mis-targeting because it explains how the lack of complete information and different objectives between the principal and the agent can prevent an optimal allocation of aid disbursements from occurring. The principal-agent model, models a situation when one party, the principal, hires another party, the agent, to work on their behalf, a problem arises when the agent possesses information that is too costly for the principal to obtain. The paper argues that the primary goal of the government and the non-government organizations (NGOs), i.e. the principal, is to provide aid to the poorest households, but by allocating the task to a lower administrative unit, i.e. the agent, they provide the agent with power that could possibly be used in a manner that does not reflect the interests of the Government

[1] Some explanations have been attributed to inertia in program placement and a tendency to allocate aid to households who have a history of past aid receipts [Jayne et al., 2002]

and the NGOs.

Results show that the probability of receiving aid decreases with the more livestock owned, increases for female headed households and decreases for powerful households the worst their shocks. We interpret the findings for powerful households to suggest that powerful households depend on other sources of assistance during times of hardships. Conditional on receiving free food aid, however, food aid receipts decrease for female headed households, increase for older households, and increases for powerful households the worst their shocks. We interpret these findings to suggest that powerful households which become eligible for aid receive more aid. Findings also show that powerful households in poorer villages have a higher probability of receiving aid. Our results suggest that efficient targeting may be done in the selection of recipient households but inefficiencies tend to arise in the allocation of aid receipts where households with power or influence receive significantly more aid than households which are not powerful.

The outline of the paper is as follows. Section 2 describes the food process in Ethiopia. Section 3 provides the theoretical model. We describe the data used in section 4 and provide descriptive statistics. Section 5 provides the empirical specification. The results and interpretations are presented in section 6 and section 7 concludes.

2 Food Aid Distributions in Ethiopia

It is unclear about the process of allocating food aid across areas and households. There appear to be variation in distribution across villages and within the same villages over time which have been attributed to differences in the amount of food-aid available and the number of households preceived to be in need. Documentation suggest that there are at least two levels of food needs assessments, the Wereda or district level and then at the household level. Members representing the government, international donors, and NGOs conduct Wereda level assessments while representatives at a lower administrative unit identify needy households.

The governmental organization which overseas the Wereda level assessment is the Disaster Prevention and Preparedness Commission (DPPC) first established in 1974 with the objective to try to prevent disasters and to reduce individual's vulnerability to disasters. A primary goal of the DPPC is to direct resources towards addressing the root causes of vulnerability to famine and food shortages by linking relief with development. The effectiveness of food aid targeting is crucial in meeting the objectives and goals of the DPPC. Indicators that determine Wereda level need consist of weather conditions, crop production, livestock availability, wage labor opportunities, and market conditions.

Household level assessments are conducted by the peasant association (PA), the lowest administrative unit in Ethiopia which consists of several villages. A committee of PA elders and representatives, who possess local knowledge of area and individual need, report their assessments to the

Wereda Administration. Documentation along with independent studies suggests some criteria used in determining need at the household level are asset ownership, outside support, non-agricultural income, ability to work, and old age.

The objective of this paper is to try to explain previous author's findings that a nontrivial amount of aid reaches relatively food secure households while relatively food insecure households are either excluded from receiving aid or receive significantly smaller proportions [Jayne et al., 2002, Dercon and Krishnan, 2003]. In this paper, we argue that these findings are consistent whenever there are a number of parties involved in the food aid distribution process with different objective functions. We provide a model using a principal-agent framework that can account for such findings.

3 An agency model of aid

The above description suggests how complicated needs assessment can be. It requires not only objective measures of need, such as income, disability, and education but also non-objective measures of need (local knowledge), such as land quality, labor ability and outside household support. Subjective measures of need, while important, also allow room for errors of inclusion and exclusion. Given the importance of local knowledge in determining need, it is crucial to understand how to implement policies that take advantage of local knowledge while minimizing the abuse that may come along with it (i.e. bias in selection, influence by powerful groups). The following principal-agent model provides a basic set-up that illustrates some necessary features included in an optimal contract that chooses to take advantage of village level assessments.

We assume there are two types of households, food secure households and food insecure households, such that income of the food secure households is strictly greater than income for the food insecure households. A utilitarian social planner wishes to maximize welfare through the distribution of food aid to the food insecure households. Household income for the i^{th} household is given by

$$y_i = \theta l_i + n_i \tag{1}$$

where l is a household asset, such as land (or livestock), θ is a productivity parameter and n is the income of the household obtained from *non-land* sources. It could also be interpreted as a random component of income from land. All that is important from our perspective is that l is always observed by the social planner whereas n may only be observed by lower level agencies involved with the distribution of food aid. We assume that average landholdings for food secure households are higher than average landholdings of food insecure households

$$\bar{l}_{secure} > \bar{l}_{insecure} \tag{2}$$

Households have identical preferences given by $U(y + \delta)$, where δ is the amount of aid a household receives. The distribution of income is given by $F(y)$ and the distribution of n by $G(n)$. Income takes values in the interval $[\underline{y}, \overline{y}]$ and its component n lies in $[\underline{n}, \overline{n}]$.

We denote by Δ the total stock of food aid available for distribution in a given period and by $\delta(y)$, the amount of aid received by a household with (pre-aid) income y.

3.1 The optimal distribution of aid

The planner solves[2]:

$$Max \int_{\underline{y}}^{\overline{y}} U(z+\delta)f(z)dz \tag{3}$$

subject to

$$\int_{\underline{y}}^{\overline{y}} \delta(z)f(z)dz = \Delta \tag{4}$$

If utility is strictly concave, then the solution to this problem is characterized by a threshold income level $\hat{y}$ such that[3]

$$\begin{aligned} \delta(y) &= 0 \text{ if } y \geq \hat{y} \\ &= \hat{y} - y \text{ if } y \leq \hat{y} \end{aligned}$$

3.2 Incomplete Information

With incomplete information, the only information available to the social planner is information on the observable component of wealth, l. The planner solves:

$$Max \int_{\underline{l}}^{\overline{l}} U(z+\delta)f(z)dz \tag{5}$$

subject to

$$\int_{\underline{l}}^{\overline{l}} \delta(z)f(z)dz = \Delta \tag{6}$$

If utility is strictly concave, then the solution to this problem is characterized by a threshold land level $\hat{l}$ such that

$$\begin{aligned} \delta(l) &= 0 \text{ if } l \geq \hat{l} \\ &= \hat{l} - l \text{ if } l \leq \hat{l} \end{aligned}$$

[2] The planner maximizes over only the food insecure households.

[3] The maximization problem still allows for errors of exclusion which occurs because of the limited amount of food aid

The appearance of the nonobservable component, n, of income implicitly allows for some food secure households to have land holdings which are less than the land holdings of some food insecure households so that with incomplete information some food secure households may receive aid.

3.3 The agency problem

The presence of the unobservable component in determining wealth makes it important to obtain information on household wealth. The distribution of food aid in Ethiopia, as in most settings, requires the use of an elaborate administrative structure and lower level agencies or bureaucrats responsible for such distribution may not share the planner's objectives. We refer to this lower level individual or organization as *agents* and assume a benevolent higher organization whom we call the *planner*. In the Ethiopian case we think of the principal as the Ethiopian Government and the agent as the village level association.

The allocation that the planner can implement through the agent will depend on the agent's objectives and on the extent to which the planner can observe the characteristics of the households that actually receive aid. To focus on this agency problem, we imagine the agent as maximizing the value of influence, $I(y+\delta)$ of an allocation less any costs, C that the principal imposes on him, with both costs and influence expressed in utility terms. The value of influence from allocating aid to a household captures the ability of the household to reciprocate the favors of the agent distributing aid and assumed to be non-decreasing in the quantity of land owned by it.[4]

We further limit ourselves to the case where such costs can only be imposed if the planner can establish misallocation by the agent. We also assume that the principal directs the agent to distribute aid according to the optimal allocation rather than to maximize ex-ante social welfare. We think this is realistic and it considerably simplifies our analysis by limiting the class of contracts which we look at. Moreover we believe that some such restriction is realistic if we do not constrain the costs C that can be imposed on the agent. Punishments to bureaucrats and government bodies are generally limited unless misdemeanor can be established.

The agent has a choice to misallocate aid or not, where misallocation is defined as allocating aid to food secure households.[5] If the agent misallocates aid, his utility depends on whether or not he gets caught misallocating aid. [6] If he does not get caught his utility will be higher misallocating aid than not misallocating aid. If he gets caught, he is worse off misallocating aid. With some probability the government investigates the village, who will then know which households are food

[4] The key point here is that the agent's objective is different from the principal's objective, corruption is just one example, in the Ethiopian case it has been shown that there has been a tendency to either give everyone in the village aid regardless of need or to give all receipients the same amount of aid .

[5] We do not distinguish between a food secure household receiving aid and the total amount of aid allocated to food secure households.

[6] The following section follows the tax evasion literature.[Allingham and Sandmo, 1972]

insecure and how much aid each food insecure household should receive. If the agent is caught misallocating aid he will incur a cost, C.

The agent's problem is given by:

$$Max(1-p)\int_{\underline{y}}^{\overline{y}} I(z+\delta)f(z)dz - p(\int_{\underline{y}}^{\overline{y}} I(z+\delta)f(z)dz + C) \tag{7}$$

As a benchmark, let us begin with the full information case under which the planner can observe both aid allocations and household income. Not surprisingly, it is now possible to implement the first best allocation. The planner needs only to instruct the agent to allocate according to (5) and impose a high enough cost C in case of any deviation from this allocation that he observes.

A more realistic setting is one where the planner observes aid allocations but has limited information on household incomes. Suppose that a household's land or livestock assets denoted by l in (1) are recorded and observable but that other sources of income, n are observable only to the agent in charge of the distribution. We now turn to characterizing necessary features of any optimal contract which the planner could use under these circumstances to minimize deviations from the optimal allocation. We first characterize the set of aid recipients (in terms of their landholdings) under an optimal contract and then turn to the distribution of food aid for households in this group.

The set of recipients

Under any optimal contract, the set of landholdings of recipient households will be bounded above by $\hat{\hat{l}}$. This is the level at which even the lowest realization $\underline{n}$ would push the household to the threshold level $\hat{y}$ in (5). The first best allocation can therefore never allocate any aid to these housheolds. In terms of the parameters of our model, $\hat{\hat{l}}$ is given by:

$$\hat{\hat{l}} = \frac{\hat{y} - \underline{n}}{\theta} \tag{8}$$

In addition, the principal will choose another threshold, $\hat{l}$, and direct the agent to give aid to all households whose landholdings fall below this level. This is the level for which household income would remain below $\hat{y}$ even with the best possible realization, $\overline{n}$. This threshold is given by:

$$\hat{l} = \frac{\hat{y} - \overline{n}}{\theta} \tag{9}$$

We've established that the planner can constrain the agent to give aid to all those below $\hat{l}$ and withhold it from all those with holdings above $\hat{\hat{l}}$. How large this interval is depends on the importance of the unobservable component of income. The smaller this is, the more effectively the principal can control the group of households receiving aid disbursements.

Aid disbursements among recipients

Based on the possible realizations of n, the planner can also set a maximum allowable level of aid $\overline{\delta}(l)$ for each household, conditional on their landholding. This is given by:

$$\overline{\delta}(l) = \hat{y} - \theta l - \underline{n} \tag{10}$$

The planner can also limit the extent to which households with higher landholdings also receive higher disbursements. For any two households with landholdings l_1 and l_2, with $l_2 > l_1$, it must be case that

$$\delta_2 - \delta_1 < (\overline{n} - \underline{n}) - \theta(l_2 - l_1) \tag{11}$$

3.4 Implications

The above model, though simple, has a number of empirically testable implications.

On the set of recipients:

- The lower the observable component of wealth, the more likely powerful households are in the set of recipients.
- Powerful households which receive adverse shocks are likely to be in the set of aid recipients.
- Households that are powerful within a poor location, are likely to be in the set of recipients.

4 Data and Descriptive Statistics

We will test wether variables which capture power or influence in the village and may be unobservable to outside village members, will have an impact on the probability of receiving aid or the amount of aid receive. We are also interested in the role that idiosyncratic shocks play in the probability of powerful households receiving aid or the amount of aid received by powerful households. In order to test this, data comes from the Ethiopian Rural Household Survey (EHRS) covering six rounds of data between the years 1994 to 2004. The survey was administered by the International Food Policy Research Institute (IFPRI) in collaboration with the Department of Economics of Addis Ababa University (AAU) and the Center for the Study of African Economies (CSAE) at Oxford University.

The initial survey conducted in 1989 surveyed seven villages to study the response of households to food crises. At the time of the survey, there were no intentions of creating a longitudinal data set. The 450 households within the seven peasant associations were randomly selected while the villages located in the regions of Amahara, Oromiya, and SNNPR, in Southern and Central Ethiopia, were

primarily ones that suffered from the 1984-1985 famine and other droughts that followed between 1987 and 1989. In 1994, CSAE and AAU conducted a panel survey incorporating six of the seven villages surveyed in 1989, plus an additional nine villages to give approximately 1500 households surveyed. The villages were chosen to account for the diversity among the major farming systems. The attrition rate from 1989-1994 in the six villages used in the 1989 survey was less than 7 percent. The lost households were replaced by households which were considered by village elders and officials as being similar to, in demographic and wealth terms, as the households which could not be traced. Households formed out of households interviewed in 1989 were also interviewed, usually sons or daughters who after marriage formed their own household. The large number of randomly selected households within each village allow us to investigate within village aid allocations.

In this paper we use all six rounds from 1994 to 2004 which contain approximately 1400 households surveyed from fifteen peasant associations. Round 2 and 3 took place approximately 4-8 months apart, to ensure comparability to the other rounds, round 2 and 3 were combined in order to capture the main cropping seasons for the entire year. This leaves us with five rounds of data, with data covering the years 1994, 1995, 1997, 1999, and 2004. Of the fifteen villages surveyed, eleven peasant associations received aid in at least one round. Between fifteen and forty-two percent of our sample received aid in a given round, with as much as one hundred percent coverage in the village of Korodegaga in round two to as little as eleven percent coverage in the village of Adele Keke. Table 1 gives the spatial and temporal coverage for each of the villages in our analysis.

In determining the probability of receiving aid, we use all households in the villages which received aid, while in determining the amount of aid received we restrict our analysis to only households which received aid. In a poor country like Ethiopia where approximately 45 percent of the population live below the national poverty line, forces us to first consider how important is food aid targeting. Table 2 suggests how important household targeting is, even within poor villages. Table 2 shows the annual income at the $10th$ and the $90th$ percentile within each village for each round. Within each village there is significant dispersion between the households in the lower $10th$ percentile and the households in the upper $10th$ percentile. The table also shows how the distribution of income changes over the years. For example in the village of Dinki, 1995 appeared to be an extremely bad year with the poorest 10 percent reporting no annual income and the richest 10 reporting annual income per capita above 365.50 birr. 1997 and 2004 appeared to better years, with the poorest 10 percent reporting incomes below 9 birr in 1997 and 121 birr in 2004, whereas the richest 10 percent had annual income above 530 birr in 1997 and 910 birr in 2004[7]. Table 2 also shows that the distribution in annual income is not due to inequalities in land holdings. Unlike many countries there is very little land disparities in Ethiopia. During the land reforms that took place in 1975, land became owned by the government and was redistributed based on household size so that within villages there is very little land inequalities. The largest land disparities exist in Debre Birhan with

[7] 1 U.S. dollar equals approximately 8.50 birr.

the difference in per capita land holdings between smallest 10 percent and the largest 10 percent equaling slightly more than one hectare.

The EHRS collected detailed information on household consumption, household income, household assets, and household demographics. The EHRS has detailed information on whether the household received aid, how much aid the household received, the source from whom the aid was received and whether the aid was given in-kind or in-cash. All gifts from the government or non-government organizations received by the household and reported as food aid or a donation[8] makes up our measure of free distribution[9]. Most aid is received in-kind and comes in the form of wheat, maize, sorghum and cooking oil. To convert aid into cash equivalents, the amounts were first converted to kilograms and then converted to cash equivalents using local village prices.

Developing a measure of need is difficult and has been highly debated, income has been used in previous studies as a measure of need to test how well aid has been targeted [Jayne et al., 2002, Clay et al., 1999] and most studies have found that there is little to no relationship between income and aid. The problem with interpreting the coefficient on income is that income may be endogenous, if food aid has positive health effects which may effect labor productivity or if food aid has disincentive effects. The former will lead to a positive bias in the estimate on the coefficient on income while the latter will lead to a negative bias in the estimate on the coefficient on income. There may also be random measurement error in the reporting of income which will result in attenuation bias. Finding suitable instruments to deal with the endogeneity problem has proven to be challenging in that most suitable instruments are used by the village representatives in targeting households, and it is unclear whether or not to include them in the regressions or to use them as instruments. Because of these concerns, we do not focus much attention on the interpretation of the coefficient on income, for the purpose of this analysis we interpret income as capturing idiosyncratic resource flows to the household, but we pay more attention to other variables correlated with wealth which may not suffer from endogeneity. To test the robustness of our results on the other covariates, we run each model with and without income. Income equals the sum of income from crop production, converted to cash equivalents using village level prices, income from self-employment activities, and income from wage labor. Income and aid were converted to cash equivalents using village level prices and average monthly values used.

We argue that the more power a household has within the village, the higher the incentive the agent has in allocating aid to them. One of the key variable of interest, is whether or not the household head has power in the village. The round 6 survey included a module to address social

[8] Food aid refers to free aid not food for work.

[9] labelf.nb Gifts were reported at the individual level, the sum of each individual household member's aid receipts make up the household level food aid receipts. The analysis could have been done at the individual level but aid is allocated based off of the household head characteristics. From qualitative studies [Sharp, 1997] only the household head is eligible to receive aid and can only designate another household member to pick up the aid only when the head is unable to.

interactions within the village. One of the questions ask the household head to rank how much power he has on a scale from one to nine, where one represents no power and nine represents the most power. We constructed a dummy variable for power which equals one if the household ranks himself as a six or higher. We use power to capture any influence or power the household may have in the village, after controlling for observable wealth characteristics, that may induce the village representatives to allocate aid to these households. Because our measure of power is only available in one round, we do not know explicitly how power varies over time. We argue that since our power variable is positively correlated with all measures of wealth and our measures of wealth are correlated over time, power is time-invariant.

Information on individual crop shocks were also collected. Data on shocks were self-reported, and based on recall on events occurring during the past cropping season and relevant harvest. Questions included whether crops suffered from low temperatures, wind storms, flooding, plant diseases, insect damage, livestock damage, bird damage, or weed damage. A methodology similar to the one used in Dercon and Krishnan (2000) was used to create a crop shock index which runs from 0 to 1, where 1 means the household suffered from each of the eight possible crop shocks and 0 means the household did not suffer from any of the eight possible crop shocks[10]. The crop shock variables are treated as idiosyncratic shocks and will allow us to investigate how aid is allocated to households in response to individual adverse events. Dercon and Krishnan (2000) show that the village-level variance accounted for about a third of the total variance in the crop shock index.

Additional control variables include household size, land per capita, an index for livestock ownership, age of the household head, gender of the household head, whether a member of the household works for wage labor off the farm, whether the household head participated in a food for work project, whether the household head is married, and the number of children and elderly in the household. Tables 3-6 provides descriptive statistics for each of the villages used in our analysis by the round the village received aid. The number of households surveyed in each village range from approximately 40 to 160 households. Income per capita per month varies across villages and across time within the same villages, For example, Korodegaga's average income per capita ranges from 22.85 birr per month in round 1 to 65.06 birr per month in round 6, whereas Shumsha's average income per capita ranges from 17.55 per month in round 1 to 38.05 per month in round 6. Marriage Rates are relatively high, with the lowest marriage rates in Haresaw with just over 50 percent. The average landholdings in Ethiopia is around 1 hectare per household, with average household size of about 5 members, average landholdings per capita are around .25 hectares. The data suggests that households on average suffer from two crop shocks per harvest. As shown in table 4, female headed households make up a larger fraction of aid recipients than male headed households and tend to have fewer livestock. Aid per capita varies from .82 per month to 17.98 per month as shown in table 4. From table 5, powerful households tend to have more livestock, higher incomes, and are more likely

[10]labelf.nbThe index equals the sum of each shock received divided by eight

to be married.

One concern about food aid targeting in Ethiopia has been that targeted groups are not necessarily the most needy [Clay et al., 1999]. It could be the case that the apparent mistargeting of aid could be do to the fact that vulnerable groups have not been correctly identified by the Ethiopian Government. Female headed households have been identified as vulnerable groups, and have been targeted for aid. Table 6 shows that female headed households do tend to earn less income, have smaller livestock holdings, and tend to be younger.

5 Empirical Specification

In this section, we examine the agent's allocation rule used for free distribution food aid. First, the agent decides who is eligible for food aid and then decides how much aid to allocate to each household.

$$y_{i1} = 1[\mathbf{x_i}\delta_\mathbf{1} + \mathbf{w_i}\delta_\mathbf{2} + v_i > 0] \tag{12}$$

$$y_{i2} = \mathbf{x_i}\beta_\mathbf{1} + \mathbf{w_i}\delta_\mathbf{2} + u_i \tag{13}$$

where y_{i1} is the binary free distribution participation indicator, $y_{i2} \equiv log(aid)$, x_i are household characteristics for household i observable to inside and outside village members, and w_i contain household characteristics observable only to village members. We argue that the same variables go into the decision for whether or not a household will receive aid and how much aid a household should receive once selected to receive aid but the coefficients on each variable may be different across the two regressions. Jayne et al. (2002) run the regressions above using data on a large number of nationally representative sampled households collected in 1996. The large number of districts available to Jayne et al. (2002) allows them to analyze the allocation rule across districts but because of the small number of households available within each district prevents them from adequately investigating allocations across households. We follow the analysis provided by Dercon and Krishnan (2003) who use the first three rounds of the EHRS. Like Dercon and Krishnan (2003) we are able to investigate the role of time-varying and time-invariant information and investigate the possibility of the omitted variables problem. We add to Dercon and Krishnan's (2003) analysis by investigating further the role power and other unobservable information[11] has in determining who receives aid and how much aid is received. The model we want to estimate,

$$y_{it1} = 1[\mathbf{x_{it}}\delta_\mathbf{1} + \mathbf{w_{it}}\delta_\mathbf{2} + c_i + v_{it} > 0] \tag{14}$$

[11] Unobservable information only refers to data that was collected by the survey that would not have otherwise easily been obtained by members outside of the community. There is likely to still exist information that is unobservable to the econometrician.

$$y_{it2} = \mathbf{x_{it}}\beta_\mathbf{1} + \mathbf{w_{it}}\beta_\mathbf{2} + c_i + u_{it} \tag{15}$$

where now we introduce time, t, and the presence of time-invariant variables that may or may not be observable to us, c_i. The time-varying observable household characteristics include gender of the household head, land ownership, livestock ownership, household size, and the number of children and elderly household members. The time-varying unobservable household characteristics include log monthly income per capita, whether the household suffered from any crop shocks, and the power of the household interacted with the crop shock index. The interaction term indicates whether the exposure to crop shocks has differential effects of receiving aid depending on household power. Power is also included as a time-invariant variable.

6 Results

In this section we present regressions describing the allocation of food aid to households. We first present results from our probit regression which use only villages which have partial food aid coverage. The probit estimates report the probability of receiving aid conditional on the village receiving aid. Second we present results from an OLS regression, using only households which received aid. The OLS estimates report the amount of aid received, conditional on being selected for free aid. The Probit and OLS regressions include village fixed-effects and time-varying village fixed-effects.

One of the advantages of having longitudinal data allows us to overcome the omitted variables problem that often arises with program evaluations. We replicate our results using a fixed-effects model, where the fixed-effects are the households. The fixed-effects model only uses villages and households which received aid at least twice.

Finally we present results that investigate the allocations across villages. These final regressions replace the village dummies and time-varying village dummies with village characteristics.

6.1 Probit

Table 7 presents results for the probability of receiving aid using a standard probit model using the pooled data, with robust standard errors corrected for village-cluster effects. Only villages with partial food aid coverage are used in the probit regression. Income is negative in each specification, which suggest some targeting, but is only significant in the regressions which exclude village and time-varying village effects, which suggest that there may be income targeting across villages. Female headed households have a higher probability of receiving aid, with female headed households having a 7.4 percent higher probability than male headed households of receiving aid. The more livestock the household owns, the lower the probability of receiving aid. A household receiving an additional

oxen decreases the probability of receiving aid by 2.3 percent, evaluated at the means of the other variables.

With village fixed-effects, we are able to test how responsive aid is to idiosyncratic crop shocks. The fact that the sign is opposite than what is expected suggest that aid is not being used for insurance purposes. Previous studies have shown that food aid responds to covariant shocks whereas private transfers respond to idiosyncratic shocks. The negative sign on crop shocks could be picking up the fact that households who suffer from idiosyncratic shocks are more likely to have more private transfers.

The coefficient on power interacted with household crop shocks is significant at the five percent level, suggesting that there exist some interdependency between power and crop shocks. The composite effect suggest that more powerful households are less likely to receive aid when they suffer from idiosyncratic crop shocks. This finding support the hypothesis that powerful households have more alternative options to insure themselves during shocks which make them less likely to receive aid.

6.2 OLS

Table 8 presents similar regressions but with the levels of aid received as the dependent variable and the sample restricted to those households receiving some aid. Income remains insignificant, but changes sign. Female headed households receive less aid, so that even though they have a higher probability of receiving aid, they actually receive less aid, on the magnitude of 12.7 percent less aid. Household size is also significantly negative.

The interesting finding is the positive and significant coefficient on the power, crop shock interaction. Evaluated at the mean value of a crop shock of .25, the results suggest that powerful households receive 10 percent more aid than non-powerful households. Combined with the results from the probit suggest that, while powerful households are less likely to rely on food aid in times of hardships, when they do receive aid, they receive a significant amount more than non-powerful households. We interpret these findings as evidence of manipulation on the agents part. Power is not a measure of need but it appears to be used in the allocation process. A crop shock is an idiosyncratic shock to the household which can make a household eligible for aid. While crop shocks do not appear to be used to target households (at least not in the direction we would expect), it does appear to be used to target households which should not be eligible for aid.

6.3 Fixed Effects

There could be concern that there are unobservable household characteristics correlated with some of our explanatory variables that the pooled OLS regression is not controlling for and could be biasing our results. One of the advantages of panel data is that it not only allows us to investigate

the role of time-varying variables but it also allows us to control for time-invariant unobservable household characteristics. Table 9 present our results for the levels of aid received using a household fixed effects panel estimator. If the fixed effects regression is the correct specification, then the fixed effects are consistent. The coefficient on the power, crop shock interaction term is still positive and significant.

6.4 Probit: Allocation Across Villages

Table 10 investigates the factors determining aid across villages and test what village conditions allow for powerful households to increase their chances of receiving aid. We replace the village fixed effects with the population of the village and the distance the village is from the nearest town, we replace the time-varying village fixed effects with the previous twelve months' rainfall and whether the village offered food-for-work, and the log of the village mean income per capita. We interact power with village rainfall and village income. The within village effects are similar to the results in table 7.

There appears to be good targeting at the village level, the more rain a village receives and the higher the village per capita income, the lower the probability the village receives aid. Households living in a village with log mean income per capita around the 25th percentile have an average probability of 11 percent of receiving free food and this falls to 8.9 percent at the 75th percentile. When we include power interacted with rain and village income, the results suggest that powerful households have a higher probability of receiving aid in poorer villages. These results are consistent with our model which suggest that in villages which are harder to determine relative need (every one is poor), powerful or more influential individuals are more likely to receive aid.

7 Conclusion

Understanding how well food aid is targeting is crucial because of the scarcity of food aid resources and in helping researchers better understand its effects on health and labor decisions. This paper used a principal-agent framework to explain observed food-aid allocations in rural Ethiopia. We investigated the 'agent's' decision rule in determining who is eligible for aid and how much aid to allocate. The analysis shows that information that is unobservable to non-village members and represent influence, such as power, can be used by the 'agent' to satisfy his objectives, whereas information that is observable by non-village members such as livestock ownership is used to satisfy the 'principal's' objectives.

The small number of villages did not allow us to adequately investigate across village allocations, but the large number of randomly selected households allowed us to investigate within village aid allocations. While food aid targeting did not appear perfect, there was evidence that female headed

households and elder headed households were targeted. Observable measures of wealth, such as livestock ownership appear to targeted. We used power as a proxy for unobservable influence within the village, which we assumed and provide evidence for, and showed that powerful households receive more aid when they experience an idiosyncratic shock. We interpret these findings to suggest that once a powerful household becomes eligible for aid and receives aid, the agent has an incentive or the household is able to use its influence to receive more aid. This is an interesting finding because this suggest that powerful households are able to draw scarce resources away from more needy and less powerful families.

The model suggests how costly it can be for the 'principal' to allocate aid on their own given the limited amount of information, but also shows how the best alternative can come with its own disadvantages. The paper argues that mechanisms that are most effective and efficient can also provide the most error if not implemented or enforced correctly. This paper demonstrates that inefficient outcomes can arise in situations when a number of parties involved in the allocation process of food aid possess different objectives.

Data Description: Variables Used in the Analysis

Key Variables of Interest

lninc Household Income Per Capita (Excludes public and private transfers).

AIDPC Total Household Free Food Aid Per Capita.

POWER Dummy variable 1 if Household Head Reports Being on Step 6 or Higher 0 otherwise (See Ladder).

POW-SHOCKC Power interacted with household crop shock (see Shockc)

Additional Control Variables

LANDPC Hectares of Land Per Capita

LADDER "Please imagine a nine-step ladder, where on the bottom, the first step, stand people who are completely without rights, and step 9, the highest step, stand those who have a lot of power. On which step are you?"

LSU Household Livestock Unit.

SHOCKC Household Crop Shock Index: Did any of the household crops suffer from (1) Low Temperatures (2) Wind Storm (3) Flooding (4) Plant Diseases (5) Insects (6) Livestock (7) Birds (8) Weed Damage. 1 indicates the household suffered from each shock where 0 indicates the household did not suffer from any of the shocks

FEMALE Dummy variable 1 if Head of the Household is Female, and 0 otherwise.

FFW Dummy variable 1 if Head of the Household participated in Food for Work, and 0 otherwise.

WAGE_LAB Dummy variable 1 if Head of the Household Works Outside of the Household for Pay, and 0 otherwise.

AGEHD Age of Household Head.

HHSIZE Household Size.

Num_CHLD Number of Household Members below the age of 15.

Num_OLD Number of Household Members Above the age of 55.

MARRIED Dummy variable 1 if Head of the household is Married, and 0 otherwise

Table 1: Fraction of households receiving food aid per round

Peasant Association	**Round**					
	Round 1 (1994)	**Round 2/3 (1995)**	**Round 4 (1997)**	**Round 5 (1999)**	**Round 6 (2004)**	**Total**
	Frac.	Frac.	Frac.	Frac.	Frac.	Frac.
Haresaw	0.00	0.00	0.00	0.38	0.36	0.15
Geblen	0.00	0.88	0.64	0.28	0.61	0.48
Dinki	0.00	0.83	0.00	0.26	0.50	0.32
Shumsha	0.96	0.92	0.56	0.16	0.60	0.66
Adele Keke	0.00	0.00	0.60	0.11	0.31	0.20
Korodegaga	0.17	1.00	0.00	0.00	0.75	0.38
Imdibir	0.00	0.20	0.18	0.00	0.00	0.07
Aze Deboa	0.00	0.00	0.00	0.00	0.29	0.05
Gara Godo	0.00	0.00	0.13	0.00	0.30	0.08
Doma	0.00	0.97	0.00	0.46	0.00	0.30
D.B. -Milki	0.00	0.00	0.00	0.40	0.00	0.08
Total	0.15	0.42	0.19	0.20	0.33	0.26

Source: Ethiopian Rural Survey

Table 2: Distribution of Annual Income Per Capita and Land

		Round									
Village	**Variable**	**Round 1 (1994)**		**Round 2/3 (1995)**		**Round 4 (1997)**		**Round 5 (1999)**		**Round 6 (2004)**	
		10th-tile	90th-tile	10th-tile	90th-tile	10th-tile	90th-tile	10th-tile	90th-tile	10th-tile	90th-tile
Haresaw	Income	0	545.58	28.84	312.41	52.44	943.92	22.86	510	23.92	215.94
	Land	0.05	0.25	0.05	0.25	0.05	0.19	0.06	0.26	0.05	0.25
Geblen	Income	19.08	393.53	35.6	224	12.73	136.17	19	232.6	22.5	200
	Land	0.02	0.08	0.03	0.09	0.03	0.1	0.03	0.08	0.03	0.17
Dinki	Income	50.86	397.67	0	365.5	55	367.5	9	530	120.98	909.36
	Land	0	0.88	0	0.75	0.05	0.63	0.06	0.53	0.07	0.67
Shumsha	Income	7.5	428.68	63.46	589.14	25	924.94	0	689.17	120.63	924.07
	Land	0.11	0.92	0.04	0.75	0.11	0.73	0.08	0.5	0.06	0.63
Adele Keke	Income	48	903.75	130.12	1353.85	143.99	1324.14	141.55	1249.67	179.29	1767.33
	Land	0.06	0.38	0.08	0.4	0.1	0.46	0.03	0.25	0.08	0.42
Korodegaga	Income	77.5	403	182.3	622.56	240.51	787.28	84.17	686.65	226.99	1149.94
	Land	0.27	0.85	0.32	1	0.3	0.94	0.31	1.35	0.33	1.03
Imdibir	Income	86.96	2113.38	59.8	949.41	78.73	1591.15	30.56	496.45	114.56	1054.02
	Land	0	0.05	0.01	0.06	0.01	0.05	0	0.15	0.01	0.18
Aze Deboa	Income	48.15	373.17	75.71	763.53	112.51	703.39	82.17	667.42	65.68	1032.19
	Land	0.03	0.17	0.03	0.21	0.05	0.22	0.05	0.25	0.05	0.2
Gara Godo	Income	33.13	243.13	49.68	392.43	47.55	558.06	77.03	543.46	111.48	770.66
	Land	0.03	0.15	0.04	0.19	0.05	0.25	0.06	0.27	0.04	0.25
Doma	Income	60.84	826.53	10.23	367.5	52.8	554.78	20	290.67	143.55	1042.31
	Land	0.08	0.67	0.11	1.3	0.07	1.02	0	0.75	0.06	0.47
D.B. -Milki	Income	276.5	1174	153.44	749.5	212.11	1150.58	123.81	1148.1	185.07	1433.53
	Land	0.25	1.29	0.2	1.63	0.45	1.6	0.27	1.5	0.2	1.44

Source: Ethiopian Rural Survey

Table 3: Descriptive Statistics

		Means														
Village	**Round**	**No. of HHS.**	**Income**	**Aidpc**	**Landpc**	**LSU**	**AgeHD**	**HHsize**	**Ladder**	**Power**	**Female Head**	**Aid**	**Married**	**FFW**	**Wage Labor**	**Crop Shocks**
Haresaw	Round 5	60	20.19	2.87	0.15	2.18	50.12	5.62	4.87	0.37	0.47	0.32	0.57	0.32	0.07	0.25
			(20.83)	(5.62)	(0.1)	(1.69)	(15.48)	(2.72)	(1.69)	(0.49)	(0.5)	(0.47)	(0.5)	(0.47)	(0.25)	(0.17)
	Round 6	69	8.97	1.5	0.13	2.19	52.19	5.45	4.94	0.38	0.54	0.35	0.51	0.23	0.07	0.13
			(8.94)	(3)	(0.11)	(1.8)	(16.97)	(2.49)	(1.71)	(0.49)	(0.5)	(0.48)	(0.5)	(0.43)	(0.26)	(0.13)
Geblen	Round 2/3	57	8.89	3.94	0.07	1.28	54.89	5.6	5.35	0.49	0.46	0.89	0.54	0	0	0.23
			(6.63)	(4.66)	(0.08)	(1.22)	(17.07)	(2.61)	(1.9)	(0.5)	(0.5)	(0.31)	(0.5)	(0)	(0)	(0.2)
	Round 4	56	5.62	2.8	0.06	2.42	57.23	5.82	5.34	0.48	0.43	0.66	0.57	0.04	0.05	0.07
			(9.23)	(2.84)	(0.03)	(1.67)	(16.54)	(2.26)	(1.9)	(0.5)	(0.5)	(0.48)	(0.5)	(0.19)	(0.23)	(0.14)
	Round 5	55	7.89	0.59	0.06	2.79	58.44	5.76	5.36	0.49	0.49	0.25	0.51	0.25	0.13	0.17
			(9.88)	(1.14)	(0.04)	(1.39)	(16.03)	(2.39)	(1.89)	(0.5)	(0.5)	(0.44)	(0.5)	(0.44)	(0.34)	(0.21)
	Round 6	40	9	3.61	0.09	2.38	59.72	5.78	5.63	0.55	0.38	0.6	0.68	0.15	0.25	0.03
			(8.29)	(3.86)	(0.07)	(1.56)	(14.93)	(2.65)	(1.79)	(0.5)	(0.49)	(0.5)	(0.47)	(0.36)	(0.44)	(0.05)
Dinki	Round 2/3	61	7.83	6.27	0.39	1.48	44.15	4.79	5.34	0.46	0	0.84	0.79	0	0.56	0.11
			(13.25)	(3.58)	(0.36)	(1.58)	(14.4)	(2.32)	(1.67)	(0.5)	(0)	(0.37)	(0.41)	(0)	(0.5)	(0.14)
	Round 5	60	25.35	1.1	0.27	2.9	44.85	5.47	5.43	0.47	0.03	0.2	0.82	0.02	0.12	0.11
			(21.84)	(2.52)	(0.22)	(2.26)	(14.75)	(2.52)	(1.64)	(0.5)	(0.18)	(0.4)	(0.39)	(0.13)	(0.32)	(0.1)
	Round 6	68	38.27	1.2	0.29	2.71	51.31	4.82	5.28	0.43	0.1	0.5	0.79	0.16	0.47	0.19
			(23.87)	(1.7)	(0.23)	(2.28)	(16.44)	(2.11)	(1.72)	(0.5)	(0.31)	(0.5)	(0.41)	(0.37)	(0.5)	(0.2)
Shumsha	Round 1	106	17.55	10.17	0.46	2.08	45.51	4.51	4.49	0.31	0.3	0.96	0.7	0	0.13	0.28
			(25.73)	(6.66)	(0.4)	(1.86)	(13.25)	(2.06)	(1.94)	(0.47)	(0.46)	(0.19)	(0.46)	(0)	(0.34)	(0.22)
	Round 2/3	92	28.6	15.11	0.36	2.32	46.65	4.73	4.55	0.33	0.24	0.91	0.77	0.03	0.21	0.16
			(30.64)	(18.29)	(0.26)	(1.98)	(13.41)	(2.08)	(1.94)	(0.47)	(0.43)	(0.28)	(0.42)	(0.18)	(0.41)	(0.17)
	Round 4	89	35.78	2.46	0.39	2.94	48.29	4.78	4.54	0.33	0.29	0.49	0.7	0	0.36	0.2
			(44.43)	(7.51)	(0.27)	(2.21)	(12.94)	(2.23)	(1.97)	(0.47)	(0.46)	(0.5)	(0.46)	(0)	(0.48)	(0.16)
	Round 5	76	37.41	0.64	0.29	3.09	49.58	5.22	4.68	0.36	0.24	0.14	0.74	0.25	0.3	0.09
			(36.7)	(2.46)	(0.24)	(1.93)	(13.66)	(2.26)	(1.94)	(0.48)	(0.43)	(0.35)	(0.44)	(0.44)	(0.46)	(0.13)
	Round 6	78	38.05	1.38	0.31	2.74	53.21	4.87	4.31	0.28	0.45	0.59	0.51	0.19	0.37	0.22
			(24.48)	(1.9)	(0.25)	(2.09)	(12.26)	(2.19)	(1.7)	(0.45)	(0.5)	(0.5)	(0.5)	(0.4)	(0.49)	(0.24)
Adele Keke	Round 4	84	60.89	1.74	0.28	1.87	46.95	6.51	5.88	0.56	0.24	0.62	0.71	0.01	0.25	0.16
			(59.17)	(2.02)	(0.27)	(1.38)	(14.21)	(2.74)	(2.01)	(0.5)	(0.43)	(0.49)	(0.45)	(0.11)	(0.44)	(0.14)
	Round 6	78	67.04	1.6	0.22	1.75	49.73	6.58	5.92	0.59	0.31	0.31	0.58	0.13	0.21	0.18
			(60.78)	(5.07)	(0.14)	(1.52)	(13.43)	(2.43)	(2.03)	(0.5)	(0.46)	(0.46)	(0.5)	(0.34)	(0.41)	(0.21)
Korodegaga	Round 1	92	22.85	0.39	0.55	3.64	43.77	6.61	5.04	0.35	0.28	0.15	0.78	0	0.43	0.2
			(34.99)	(1.16)	(0.25)	(3.66)	(12.48)	(2.4)	(1.97)	(0.48)	(0.45)	(0.36)	(0.41)	(0)	(0.5)	(0.24)
	Round 2/3	90	33.18	16.01	0.59	3.47	44.74	6.53	5.02	0.34	0.28	1	0.79	0	0.23	0.05
			(16.58)	(11.38)	(0.28)	(3.57)	(12.61)	(2.61)	(1.93)	(0.48)	(0.45)	(0)	(0.41)	(0)	(0.43)	(0.08)
	Round 6	91	65.06	2.52	0.64	3.73	48.93	5.62	5.1	0.36	0.42	0.77	0.6	0.53	0.53	0.05
			(90)	(3.84)	(0.37)	(3.45)	(13.63)	(2.12)	(1.99)	(0.48)	(0.5)	(0.42)	(0.49)	(0.5)	(0.5)	(0.09)
Imdibir	Round 2/3	63	40.55	0.25	0.03	2.17	49.05	7.68	3.48	0.11	0.14	0.21	0.83	0.25	0.52	0.3
			(74.43)	(0.61)	(0.02)	(3.07)	(12.79)	(2.9)	(1.77)	(0.32)	(0.35)	(0.41)	(0.38)	(0.44)	(0.5)	(0.18)
	Round 4	61	46.01	0.65	0.03	2.13	50.36	7.48	3.49	0.11	0.18	0.18	0.75	0	0.38	0.23
			(81.22)	(3.63)	(0.02)	(1.95)	(12.92)	(3)	(1.79)	(0.32)	(0.39)	(0.39)	(0.43)	(0)	(0.49)	(0.1)
Aze Deboa	Round 6	58	42.11	0.82	0.14	2.73	52.21	7.78	4.97	0.22	0.26	0.29	0.72	0.41	0.29	0.24
			(88.77)	(5.08)	(0.18)	(1.65)	(12.89)	(2.2)	(1.63)	(0.42)	(0.44)	(0.46)	(0.45)	(0.5)	(0.46)	(0.24)
Gara Godo	Round 4	89	27.41	0.74	0.12	1.51	48.11	6.58	4.1	0.11	0.26	0.12	0.72	0.01	0.1	0.22
			(59.52)	(3)	(0.1)	(1.16)	(13.97)	(2.89)	(1.78)	(0.32)	(0.44)	(0.33)	(0.45)	(0.11)	(0.3)	(0.2)
	Round 6	85	30.21	0.24	0.14	1.8	52.55	5.41	4.18	0.12	0.28	0.29	0.67	0.12	0.13	0.34
			(26.93)	(0.69)	(0.08)	(1.09)	(14.81)	(2.03)	(1.75)	(0.32)	(0.45)	(0.46)	(0.47)	(0.32)	(0.34)	(0.23)
Doma	Round 2/3	59	15.52	3.96	0.6	1.22	39.31	5.49	4.56	0.2	0.05	0.97	0.76	0.64	0.37	0.3
			(18.8)	(3.4)	(0.49)	(1.7)	(14.72)	(2.57)	(1.61)	(0.41)	(0.22)	(0.18)	(0.43)	(0.48)	(0.49)	(0.24)
	Round 5	44	9.96	1.08	0.38	2.43	39.66	5.59	4.91	0.25	0.05	0.45	0.84	0.02	0.14	0.26
			(8.93)	(2.38)	(0.35)	(2.08)	(11.94)	(2.39)	(1.52)	(0.44)	(0.21)	(0.5)	(0.37)	(0.15)	(0.35)	(0.19)
D.B. -Milki	Round 5	159	55.11	6.9	0.7	6.4	52.03	5.73	5.58	0.48	0.24	0.38	0.65	0	0.13	0.05
			(38.88)	(10.76)	(0.51)	(3.27)	(16.06)	(2.24)	(1.63)	(0.5)	(0.43)	(0.49)	(0.48)	(0)	(0.34)	(0.08)

Source: Ethiopian Rural Survey

Table 4: Descriptive Statistics by Aid

			Means													
Village	**Round**	**Aid**	**No. of HHS.**	**Income**	**Aidpc**	**Landpc**	**LSU**	**AgeHD**	**HHsize**	**Ladder**	**Power**	**Female Head**	**Married**	**FFW**	**Wage Labor**	**Crop Shocks**
Haresaw	Round 5	0	41	17.31	0	0.14	2.39	49.59	5.71	4.9	0.39	0.46	0.61	0.24	0.07	0.24
				(17.65)	(0)	(0.08)	(1.8)	(15.12)	(2.53)	(1.76)	(0.49)	(0.5)	(0.49)	(0.43)	(0.26)	(0.15)
		1	19	26.41	9.05	0.16	1.73	51.26	5.42	4.79	0.32	0.47	0.47	0.47	0.05	0.27
				(25.9)	(6.67)	(0.13)	(1.37)	(16.59)	(3.15)	(1.58)	(0.48)	(0.51)	(0.51)	(0.51)	(0.23)	(0.2)
	Round 6	0	45	8.42	0	0.12	2.24	50.8	5.64	4.84	0.38	0.47	0.51	0.29	0.04	0.13
				(7.09)	(0)	(0.09)	(1.9)	(17.7)	(2.39)	(1.83)	(0.49)	(0.5)	(0.51)	(0.46)	(0.21)	(0.13)
		1	24	9.99	4.31	0.15	2.09	54.79	5.08	5.13	0.38	0.67	0.5	0.13	0.13	0.12
				(11.75)	(3.73)	(0.16)	(1.62)	(15.54)	(2.67)	(1.48)	(0.49)	(0.48)	(0.51)	(0.34)	(0.34)	(0.13)
Geblen	Round 2/3	0	6	7.01	0	0.06	1.8	52	6.17	4.67	0.17	0.17	0.83	0	0	0.27
				(3.64)	(0)	(0.01)	(0.72)	(9.51)	(2.32)	(1.03)	(0.41)	(0.41)	(0.41)	(0)	(0)	(0.19)
		1	51	9.11	4.4	0.07	1.22	55.24	5.53	5.43	0.53	0.49	0.51	0	0	0.23
				(6.89)	(4.71)	(0.08)	(1.26)	(17.78)	(2.66)	(1.97)	(0.5)	(0.5)	(0.5)	(0)	(0)	(0.2)
	Round 4	0	19	3.72	0	0.05	2.21	53.53	6.47	5.37	0.42	0.42	0.58	0.11	0.11	0.08
				(3.42)	(0)	(0.03)	(0.95)	(15.08)	(2.04)	(2.17)	(0.51)	(0.51)	(0.51)	(0.32)	(0.32)	(0.11)
		1	37	6.59	4.23	0.06	2.53	59.14	5.49	5.32	0.51	0.43	0.57	0	0.03	0.06
				(11.02)	(2.46)	(0.03)	(1.95)	(17.13)	(2.32)	(1.78)	(0.51)	(0.5)	(0.5)	(0)	(0.16)	(0.15)
	Round 5	0	41	9.43	0	0.06	3.05	57.51	5.93	5.59	0.56	0.49	0.54	0.29	0.15	0.15
				(10.99)	(0)	(0.04)	(1.32)	(15.95)	(2.5)	(1.87)	(0.5)	(0.51)	(0.5)	(0.46)	(0.36)	(0.19)
		1	14	3.38	2.33	0.06	2.03	61.14	5.29	4.71	0.29	0.5	0.43	0.14	0.07	0.21
				(2.24)	(1.03)	(0.03)	(1.37)	(16.58)	(2.02)	(1.86)	(0.47)	(0.52)	(0.51)	(0.36)	(0.27)	(0.26)
	Round 6	0	16	7.51	0	0.08	2.73	56	5.81	4.63	0.19	0.5	0.56	0.25	0.25	0.05
				(5.6)	(0)	(0.04)	(1.77)	(14.94)	(2.51)	(1.26)	(0.4)	(0.52)	(0.51)	(0.45)	(0.45)	(0.07)
		1	24	9.99	6.02	0.1	2.14	62.21	5.75	6.29	0.79	0.29	0.75	0.08	0.25	0.02
				(9.67)	(3.19)	(0.08)	(1.39)	(14.7)	(2.79)	(1.81)	(0.41)	(0.46)	(0.44)	(0.28)	(0.44)	(0.04)
Dinki	Round 2/3	0	10	7.4	0	0.34	0.94	38.6	5.1	4.7	0.2	0	0.8	0	0.6	0.04
				(6.05)	(0)	(0.29)	(1.29)	(13.85)	(2.18)	(1.57)	(0.42)	(0)	(0.42)	(0)	(0.52)	(0.13)
		1	51	7.91	7.5	0.4	1.59	45.24	4.73	5.47	0.51	0	0.78	0	0.55	0.12
				(14.29)	(2.45)	(0.37)	(1.62)	(14.39)	(2.36)	(1.68)	(0.5)	(0)	(0.42)	(0)	(0.5)	(0.14)
	Round 5	0	48	25.39	0	0.27	2.93	44.44	5.44	5.48	0.46	0.04	0.79	0.02	0.13	0.12
				(23.15)	(0)	(0.23)	(2.37)	(15.01)	(2.58)	(1.73)	(0.5)	(0.2)	(0.41)	(0.14)	(0.33)	(0.1)
		1	12	25.19	5.48	0.29	2.76	46.5	5.58	5.25	0.5	0	0.92	0	0.08	0.07
				(16.42)	(2.79)	(0.18)	(1.81)	(14.15)	(2.35)	(1.29)	(0.52)	(0)	(0.29)	(0)	(0.29)	(0.05)
	Round 6	0	34	33.47	0	0.27	2.9	47.79	5.47	5.68	0.41	0.09	0.91	0.32	0.44	0.23
				(19.33)	(0)	(0.25)	(1.86)	(15.1)	(2)	(1.66)	(0.5)	(0.29)	(0.29)	(0.47)	(0.5)	(0.23)
		1	34	43.07	2.4	0.32	2.52	54.82	4.18	4.88	0.44	0.12	0.68	0	0.5	0.15
				(27.12)	(1.71)	(0.21)	(2.65)	(17.19)	(2.04)	(1.7)	(0.5)	(0.33)	(0.47)	(0)	(0.51)	(0.15)
Shumsha	Round 1	0	4	31.31	0	0.34	0.94	50.75	4.25	4.5	0.25	0.25	0.75	0	0.5	0.26
				(36.49)	(0)	(0.06)	(0.46)	(15.31)	(1.71)	(1.29)	(0.5)	(0.5)	(0.5)	(0)	(0.58)	(0.22)
		1	102	17.02	10.57	0.46	2.13	45.3	4.52	4.49	0.31	0.3	0.7	0	0.12	0.29
				(25.31)	(6.47)	(0.4)	(1.88)	(13.21)	(2.08)	(1.96)	(0.47)	(0.46)	(0.46)	(0)	(0.32)	(0.22)
	Round 2/3	0	8	35.08	0	0.29	3.06	42.5	6	4.38	0.25	0.25	0.88	0	0.13	0.13
				(54.16)	(0)	(0.18)	(2.5)	(8.6)	(2.51)	(1.92)	(0.46)	(0.46)	(0.35)	(0)	(0.35)	(0.11)
		1	84	27.98	16.55	0.37	2.25	47.05	4.61	4.57	0.33	0.24	0.76	0.04	0.21	0.17
				(27.88)	(18.51)	(0.27)	(1.93)	(13.75)	(2.01)	(1.95)	(0.47)	(0.43)	(0.43)	(0.19)	(0.41)	(0.17)
	Round 4	0	45	39.92	0	0.34	3.42	45.51	5.27	4.56	0.36	0.22	0.78	0	0.38	0.22
				(50.87)	(0)	(0.25)	(2.05)	(11.89)	(2.25)	(1.89)	(0.48)	(0.42)	(0.42)	(0)	(0.49)	(0.15)
		1	44	31.55	4.98	0.45	2.46	51.14	4.27	4.52	0.3	0.36	0.61	0	0.34	0.17
				(36.82)	(10.12)	(0.28)	(2.28)	(13.48)	(2.12)	(2.06)	(0.46)	(0.49)	(0.49)	(0)	(0.48)	(0.16)
	Round 5	0	65	36.49	0	0.25	3.13	49.71	5.42	4.6	0.34	0.25	0.74	0.28	0.29	0.1
				(37.71)	(0)	(0.21)	(1.98)	(13.9)	(2.25)	(1.91)	(0.48)	(0.43)	(0.44)	(0.45)	(0.46)	(0.13)
		1	11	42.84	4.43	0.48	2.82	48.82	4.09	5.18	0.45	0.18	0.73	0.09	0.36	0.05
				(30.96)	(5.2)	(0.33)	(1.69)	(12.7)	(2.07)	(2.14)	(0.52)	(0.4)	(0.47)	(0.3)	(0.5)	(0.06)
	Round 6	0	32	35.08	0	0.3	2.88	51.72	5.22	4.22	0.28	0.41	0.56	0.22	0.31	0.26
				(22.56)	(0)	(0.22)	(2.15)	(11.33)	(2)	(1.84)	(0.46)	(0.5)	(0.5)	(0.42)	(0.47)	(0.25)
		1	46	40.11	2.34	0.31	2.64	54.24	4.63	4.37	0.28	0.48	0.48	0.17	0.41	0.19
				(25.76)	(1.97)	(0.26)	(2.06)	(12.89)	(2.31)	(1.61)	(0.46)	(0.51)	(0.51)	(0.38)	(0.5)	(0.23)

Source: Ethiopian Rural Survey

Continued

Table 4: Descriptive Statistics by Aid

			Means													
Village	**Round**	**Aid**	**No. of HHS.**	**Income**	**Aidpc**	**Landpc**	**LSU**	**AgeHD**	**HHsize**	**Ladder**	**Power**	**Female Head**	**Married**	**FFW**	**Wage Labor**	**Crop Shocks**
Adele Keke	Round 4	0	32	77.6	0	0.33	2	46.66	6.06	6.66	0.63	0.19	0.72	0	0.16	0.18
				(80)	(0)	(0.37)	(1.33)	(16.34)	(3.13)	(1.68)	(0.49)	(0.4)	(0.46)	(0)	(0.37)	(0.14)
		1	52	50.6	2.82	0.25	1.79	47.13	6.79	5.4	0.52	0.27	0.71	0.02	0.31	0.15
				(39.06)	(1.88)	(0.18)	(1.42)	(12.89)	(2.45)	(2.07)	(0.5)	(0.45)	(0.46)	(0.14)	(0.47)	(0.14)
	Round 6	0	54	62.93	0	0.21	1.93	48.67	6.78	6	0.59	0.28	0.63	0.09	0.17	0.16
				(59.46)	(0)	(0.13)	(1.64)	(13.05)	(2.52)	(1.73)	(0.5)	(0.45)	(0.49)	(0.29)	(0.38)	(0.19)
		1	24	76.3	5.21	0.24	1.32	52.13	6.13	5.75	0.58	0.38	0.46	0.21	0.29	0.24
				(63.97)	(8.15)	(0.16)	(1.11)	(14.22)	(2.21)	(2.63)	(0.5)	(0.49)	(0.51)	(0.41)	(0.46)	(0.23)
Korodegaga	Round 1	0	78	21.18	0	0.55	3.82	44.28	6.71	5.01	0.33	0.27	0.79	0	0.44	0.21
				(31.94)	(0)	(0.21)	(3.84)	(12.69)	(2.42)	(1.92)	(0.47)	(0.45)	(0.41)	(0)	(0.5)	(0.25)
		1	14	32.13	2.59	0.56	2.66	40.93	6.07	5.21	0.43	0.36	0.71	0	0.43	0.1
				(49.18)	(1.79)	(0.43)	(2.34)	(11.17)	(2.27)	(2.29)	(0.51)	(0.5)	(0.47)	(0)	(0.51)	(0.12)
	Round 2/3	1	90	33.18	16.01	0.59	3.47	44.74	6.53	5.02	0.34	0.28	0.79	0	0.23	0.05
				(16.58)	(11.38)	(0.28)	(3.57)	(12.61)	(2.61)	(1.93)	(0.48)	(0.45)	(0.41)	(0)	(0.43)	(0.08)
	Round 6	0	21	93.47	0	0.59	3.13	49.9	5.43	4.9	0.29	0.33	0.57	0.52	0.62	0.04
				(99.74)	(0)	(0.2)	(2.38)	(12.66)	(1.66)	(1.7)	(0.46)	(0.48)	(0.51)	(0.51)	(0.5)	(0.08)
		1	70	56.54	3.27	0.66	3.91	48.64	5.67	5.16	0.39	0.44	0.61	0.53	0.5	0.06
				(85.8)	(4.09)	(0.41)	(3.7)	(13.98)	(2.24)	(2.08)	(0.49)	(0.5)	(0.49)	(0.5)	(0.5)	(0.09)
Imdibir	Round 2/3	0	50	39.17	0	0.03	2.39	50.38	7.48	3.34	0.12	0.18	0.78	0.24	0.5	0.32
				(78.04)	(0)	(0.02)	(3.38)	(13.32)	(3.16)	(1.83)	(0.33)	(0.39)	(0.42)	(0.43)	(0.51)	(0.18)
		1	13	45.89	1.2	0.02	1.29	43.92	8.46	4	0.08	0	1	0.31	0.62	0.22
				(60.95)	(0.83)	(0.01)	(1)	(9.2)	(1.33)	(1.47)	(0.28)	(0)	(0)	(0.48)	(0.51)	(0.17)
	Round 4	0	50	42.72	0	0.03	2.04	50.66	7.3	3.5	0.14	0.22	0.7	0	0.34	0.23
				(76.45)	(0)	(0.02)	(1.35)	(13.42)	(3.19)	(1.87)	(0.35)	(0.42)	(0.46)	(0)	(0.48)	(0.1)
		1	11	60.94	3.62	0.02	2.57	49	8.27	3.45	0	0	1	0	0.55	0.25
				(103.18)	(8.21)	(0.01)	(3.71)	(10.78)	(1.79)	(1.51)	(0)	(0)	(0)	(0)	(0.52)	(0.13)
Aze Deboa	Round 6	0	41	49.08	0	0.15	2.67	52.76	7.76	5.12	0.24	0.24	0.71	0.44	0.34	0.27
				(104.05)	(0)	(0.21)	(1.4)	(12.88)	(2.2)	(1.68)	(0.43)	(0.43)	(0.46)	(0.5)	(0.48)	(0.26)
		1	17	25.28	2.8	0.09	2.86	50.88	7.82	4.59	0.18	0.29	0.76	0.35	0.18	0.17
				(24.19)	(9.28)	(0.04)	(2.19)	(13.22)	(2.27)	(1.5)	(0.39)	(0.47)	(0.44)	(0.49)	(0.39)	(0.17)
Gara Godo	Round 4	0	78	29.34	0	0.12	1.46	48.04	6.68	4.13	0.1	0.27	0.71	0.01	0.1	0.23
				(63.3)	(0)	(0.11)	(1.18)	(13.71)	(2.92)	(1.77)	(0.31)	(0.45)	(0.46)	(0.11)	(0.31)	(0.2)
		1	11	13.7	5.97	0.11	1.81	48.64	5.91	3.91	0.18	0.18	0.82	0	0.09	0.19
				(9.34)	(6.69)	(0.08)	(1)	(16.46)	(2.7)	(1.97)	(0.4)	(0.4)	(0.4)	(0)	(0.3)	(0.12)
	Round 6	0	60	28.8	0	0.14	1.86	52.28	5.53	4.2	0.1	0.25	0.7	0.05	0.1	0.35
				(22.69)	(0)	(0.08)	(1.13)	(15.06)	(2.06)	(1.88)	(0.3)	(0.44)	(0.46)	(0.22)	(0.3)	(0.23)
		1	25	33.6	0.82	0.14	1.64	53.2	5.12	4.12	0.16	0.36	0.6	0.28	0.2	0.34
				(35.44)	(1.07)	(0.09)	(0.97)	(14.48)	(1.96)	(1.45)	(0.37)	(0.49)	(0.5)	(0.46)	(0.41)	(0.25)
Doma	Round 2/3	0	2	22.17	0	0.7	2.2	28.5	3	4.5	0.5	0	0.5	0	0	0.52
				(31.36)	(0)	(0.42)	(1.7)	(3.54)	(2.83)	(2.12)	(0.71)	(0)	(0.71)	(0)	(0)	(0.09)
		1	57	15.28	4.09	0.6	1.18	39.68	5.58	4.56	0.19	0.05	0.77	0.67	0.39	0.3
				(18.63)	(3.38)	(0.5)	(1.71)	(14.83)	(2.54)	(1.61)	(0.4)	(0.23)	(0.42)	(0.48)	(0.49)	(0.24)
	Round 5	0	24	8.59	0	0.38	2.15	37.38	5.29	4.83	0.25	0.04	0.88	0.04	0.04	0.24
				(6.99)	(0)	(0.32)	(1.97)	(12.08)	(2.1)	(1.55)	(0.44)	(0.2)	(0.34)	(0.2)	(0.2)	(0.22)
		1	20	11.61	2.37	0.38	2.76	42.4	5.95	5	0.25	0.05	0.8	0	0.25	0.29
				(10.77)	(3.11)	(0.39)	(2.22)	(11.46)	(2.7)	(1.52)	(0.44)	(0.22)	(0.41)	(0)	(0.44)	(0.16)
D.B. -Milki	Round 5	0	98	60.35	0	0.59	7.58	52.39	6.27	5.81	0.54	0.13	0.74	0	0.12	0.05
				(42.11)	(0)	(0.37)	(3.26)	(15.6)	(2.24)	(1.64)	(0.5)	(0.34)	(0.44)	(0)	(0.33)	(0.07)
		1	61	46.7	17.98	0.87	4.5	51.46	4.87	5.21	0.38	0.41	0.51	0	0.15	0.05
				(31.57)	(10.12)	(0.64)	(2.25)	(16.89)	(1.96)	(1.56)	(0.49)	(0.5)	(0.5)	(0)	(0.36)	(0.09)

Source: Ethiopian Rural Survey

Table 5: Descriptive Statistics by Power

			Means												
Village	**Round**	**Power**	**No. of HHS.**	**Income**	**Aidpc**	**Landpc**	**LSU**	**AgeHD**	**HHsize**	**Ladder**	**Female Head**	**Aid**	**Married**	**FFW**	**Wage Labor**	**Crop Shocks**
Haresaw	Round 5	0	38	18.68	3.15	0.14	2.05	49.82	5.82	3.82	0.45	0.34	0.58	0.26	0.05	0.24
				(14.24)	(6)	(0.08)	(1.78)	(15.64)	(2.76)	(1.09)	(0.5)	(0.48)	(0.5)	(0.45)	(0.23)	(0.16)
		1	22	22.8	2.38	0.16	2.4	50.64	5.27	6.68	0.5	0.27	0.55	0.41	0.09	0.26
				(29.17)	(5)	(0.13)	(1.55)	(15.55)	(2.68)	(0.72)	(0.51)	(0.46)	(0.51)	(0.5)	(0.29)	(0.18)
	Round 6	0	43	7.42	1.45	0.13	2.2	52.14	5.7	3.86	0.53	0.35	0.51	0.26	0.05	0.12
				(5.7)	(2.95)	(0.1)	(1.98)	(16.9)	(2.56)	(1.13)	(0.5)	(0.48)	(0.51)	(0.44)	(0.21)	(0.14)
		1	26	11.53	1.58	0.15	2.17	52.27	5.04	6.73	0.54	0.35	0.5	0.19	0.12	0.13
				(12.32)	(3.14)	(0.14)	(1.49)	(17.42)	(2.36)	(0.72)	(0.51)	(0.49)	(0.51)	(0.4)	(0.33)	(0.12)
Geblen	Round 2/3	0	29	8.28	3.49	0.07	1.16	49.69	5.45	3.83	0.48	0.83	0.52	0	0	0.22
				(5.71)	(3.83)	(0.06)	(1.07)	(16.8)	(2.06)	(1.28)	(0.51)	(0.38)	(0.51)	(0)	(0)	(0.19)
		1	28	9.52	4.4	0.07	1.4	60.29	5.75	6.93	0.43	0.96	0.57	0	0	0.25
				(7.52)	(5.41)	(0.09)	(1.37)	(15.87)	(3.11)	(0.86)	(0.5)	(0.19)	(0.5)	(0)	(0)	(0.21)
	Round 4	0	29	7.26	2.26	0.06	2.56	52.72	5.93	3.86	0.45	0.62	0.55	0.07	0.03	0.06
				(11.92)	(2.42)	(0.03)	(1.92)	(15.87)	(2.19)	(1.3)	(0.51)	(0.49)	(0.51)	(0.26)	(0.19)	(0.13)
		1	27	3.85	3.38	0.06	2.28	62.07	5.7	6.93	0.41	0.7	0.59	0	0.07	0.07
				(4.59)	(3.17)	(0.03)	(1.38)	(16.14)	(2.37)	(0.87)	(0.5)	(0.47)	(0.5)	(0)	(0.27)	(0.15)
	Round 5	0	28	6.05	0.83	0.06	2.61	54.21	5.54	3.86	0.54	0.36	0.43	0.18	0.14	0.22
				(8.42)	(1.27)	(0.05)	(1.6)	(14.48)	(2.28)	(1.27)	(0.51)	(0.49)	(0.5)	(0.39)	(0.36)	(0.23)
		1	27	9.8	0.34	0.06	2.98	62.81	6	6.93	0.44	0.15	0.59	0.33	0.11	0.12
				(11.04)	(0.96)	(0.02)	(1.15)	(16.65)	(2.51)	(0.87)	(0.51)	(0.36)	(0.5)	(0.48)	(0.32)	(0.17)
	Round 6	0	18	8.58	1.9	0.1	2.16	55.72	4.94	3.94	0.5	0.28	0.56	0.22	0.22	0.06
				(9.57)	(3.37)	(0.08)	(1.39)	(14.73)	(2.44)	(1)	(0.51)	(0.46)	(0.51)	(0.43)	(0.43)	(0.06)
		1	22	9.34	5.02	0.08	2.56	63	6.45	7	0.27	0.86	0.77	0.09	0.27	0.01
				(7.3)	(3.73)	(0.06)	(1.7)	(14.6)	(2.67)	(0.87)	(0.46)	(0.35)	(0.43)	(0.29)	(0.46)	(0.02)
Dinki	Round 2/3	0	33	7.41	5.81	0.45	1.18	48.7	4.76	4.09	0	0.76	0.73	0	0.58	0.11
				(12.14)	(4.02)	(0.44)	(1.26)	(14.72)	(2.44)	(1.04)	(0)	(0.44)	(0.45)	(0)	(0.5)	(0.15)
		1	28	8.32	6.82	0.32	1.84	38.79	4.82	6.82	0	0.93	0.86	0	0.54	0.11
				(14.67)	(2.97)	(0.22)	(1.84)	(12.21)	(2.21)	(0.86)	(0)	(0.26)	(0.36)	(0)	(0.51)	(0.14)
	Round 5	0	32	23.86	1.32	0.3	2.62	48.22	5.19	4.16	0.03	0.19	0.78	0	0.13	0.11
				(17.37)	(2.99)	(0.25)	(2.31)	(15.9)	(2.25)	(0.92)	(0.18)	(0.4)	(0.42)	(0)	(0.34)	(0.11)
		1	28	27.05	0.84	0.24	3.21	41	5.79	6.89	0.04	0.21	0.86	0.04	0.11	0.12
				(26.27)	(1.87)	(0.17)	(2.19)	(12.49)	(2.81)	(0.88)	(0.19)	(0.42)	(0.36)	(0.19)	(0.31)	(0.08)
	Round 6	0	39	41.02	1.42	0.3	2.42	53.74	4.62	4.05	0.1	0.49	0.77	0.13	0.44	0.19
				(27.12)	(2.02)	(0.24)	(2.22)	(16.73)	(2.05)	(1)	(0.31)	(0.51)	(0.43)	(0.34)	(0.5)	(0.2)
		1	29	34.57	0.91	0.28	3.09	48.03	5.1	6.93	0.1	0.52	0.83	0.21	0.52	0.18
				(18.45)	(1.13)	(0.22)	(2.34)	(15.73)	(2.19)	(0.88)	(0.31)	(0.51)	(0.38)	(0.41)	(0.51)	(0.2)
Shumsha	Round 1	0	73	19.66	9.58	0.46	2.01	47.05	4.48	3.41	0.34	0.96	0.67	0	0.14	0.27
				(29.13)	(7.12)	(0.38)	(1.85)	(12.88)	(2.05)	(1.09)	(0.48)	(0.2)	(0.47)	(0)	(0.35)	(0.21)
		1	33	12.91	11.46	0.46	2.25	42.09	4.58	6.88	0.21	0.97	0.76	0	0.12	0.32
				(15.16)	(5.36)	(0.44)	(1.91)	(13.62)	(2.11)	(1.05)	(0.42)	(0.17)	(0.44)	(0)	(0.33)	(0.24)
	Round 2/3	0	62	28.92	14.89	0.36	2.4	48.56	4.81	3.44	0.26	0.9	0.79	0.02	0.19	0.17
				(32.2)	(17.38)	(0.28)	(2.04)	(12.95)	(2.02)	(1.08)	(0.44)	(0.3)	(0.41)	(0.13)	(0.4)	(0.18)
		1	30	27.93	15.57	0.37	2.14	42.7	4.57	6.87	0.2	0.93	0.73	0.07	0.23	0.16
				(27.64)	(20.36)	(0.22)	(1.88)	(13.7)	(2.22)	(1.07)	(0.41)	(0.25)	(0.45)	(0.25)	(0.43)	(0.16)
	Round 4	0	60	31.02	2.04	0.39	3.04	50.03	4.72	3.42	0.32	0.52	0.68	0	0.32	0.2
				(39.7)	(3.58)	(0.28)	(2.32)	(12.42)	(2.2)	(1.12)	(0.47)	(0.5)	(0.47)	(0)	(0.47)	(0.15)
		1	29	45.64	3.34	0.4	2.74	44.69	4.9	6.86	0.24	0.45	0.72	0	0.45	0.19
				(52.29)	(12.2)	(0.24)	(1.96)	(13.46)	(2.32)	(1.09)	(0.44)	(0.51)	(0.45)	(0)	(0.51)	(0.17)
	Round 5	0	49	33.26	0.77	0.32	3.07	51.82	4.82	3.49	0.31	0.12	0.67	0.22	0.24	0.09
				(22.48)	(2.98)	(0.27)	(1.99)	(13.15)	(2.17)	(1.1)	(0.47)	(0.33)	(0.47)	(0.42)	(0.43)	(0.13)
		1	27	44.93	0.41	0.23	3.12	45.52	5.96	6.85	0.11	0.19	0.85	0.3	0.41	0.1
				(53.48)	(1.02)	(0.17)	(1.85)	(13.86)	(2.28)	(1.03)	(0.32)	(0.4)	(0.36)	(0.47)	(0.5)	(0.13)
	Round 6	0	56	36.77	1.59	0.33	2.39	54.7	4.39	3.43	0.54	0.59	0.41	0.14	0.36	0.23
				(26.32)	(2.14)	(0.25)	(1.94)	(12.47)	(1.96)	(0.99)	(0.5)	(0.5)	(0.5)	(0.35)	(0.48)	(0.26)
		1	22	41.31	0.87	0.24	3.61	49.41	6.09	6.55	0.23	0.59	0.77	0.32	0.41	0.19
				(19.15)	(0.94)	(0.21)	(2.24)	(11.09)	(2.33)	(0.86)	(0.43)	(0.5)	(0.43)	(0.48)	(0.5)	(0.18)

Source: Ethiopian Rural Survey

Continued

Table 5: Descriptive Statistics by Power

			Means													
Village	**Round**	**Power**	**No. of HHS.**	**Income**	**Aidpc**	**Landpc**	**LSU**	**AgeHD**	**HHsize**	**Ladder**	**Female Head**	**Aid**	**Married**	**FFW**	**Wage Labor**	**Crop Shocks**
Adele Keke	Round 4	0	37	52.76	1.62	0.3	1.65	47.97	6.68	4.03	0.27	0.68	0.62	0.03	0.16	0.19
				(44.61)	(1.51)	(0.37)	(1.36)	(13.45)	(2.88)	(1.19)	(0.45)	(0.47)	(0.49)	(0.16)	(0.37)	(0.16)
		1	47	67.29	1.84	0.27	2.05	46.15	6.38	7.34	0.21	0.57	0.79	0	0.32	0.14
				(68.31)	(2.36)	(0.16)	(1.39)	(14.87)	(2.64)	(1.13)	(0.41)	(0.5)	(0.41)	(0)	(0.47)	(0.12)
	Round 6	0	32	48.91	0.97	0.21	1.5	52.03	7.06	3.94	0.25	0.31	0.56	0.09	0.28	0.13
				(54.75)	(1.73)	(0.14)	(1)	(12.33)	(2.71)	(1.24)	(0.44)	(0.47)	(0.5)	(0.3)	(0.46)	(0.19)
		1	46	79.65	2.04	0.23	1.91	48.13	6.24	7.3	0.35	0.3	0.59	0.15	0.15	0.22
				(62.13)	(6.43)	(0.14)	(1.79)	(14.05)	(2.18)	(1.11)	(0.48)	(0.47)	(0.5)	(0.36)	(0.36)	(0.21)
Korodegaga	Round 1	0	60	25.33	0.26	0.53	3.55	45.53	6.65	3.85	0.3	0.13	0.78	0	0.45	0.22
				(41.35)	(0.79)	(0.23)	(3.95)	(12.99)	(2.39)	(1.07)	(0.46)	(0.34)	(0.42)	(0)	(0.5)	(0.26)
		1	32	18.18	0.65	0.58	3.82	40.47	6.53	7.28	0.25	0.19	0.78	0	0.41	0.16
				(17.48)	(1.62)	(0.3)	(3.09)	(10.89)	(2.45)	(1.11)	(0.44)	(0.4)	(0.42)	(0)	(0.5)	(0.21)
	Round 2/3	0	59	33.54	16.9	0.59	3.39	46.37	6.42	3.86	0.31	1	0.75	0	0.22	0.05
				(19.08)	(12.28)	(0.32)	(3.97)	(13.17)	(2.69)	(1.07)	(0.46)	(0)	(0.44)	(0)	(0.42)	(0.09)
		1	31	32.5	14.33	0.58	3.63	41.65	6.74	7.23	0.23	1	0.87	0	0.26	0.04
				(10.52)	(9.41)	(0.19)	(2.7)	(11.02)	(2.46)	(1.09)	(0.43)	(0)	(0.34)	(0)	(0.44)	(0.06)
	Round 6	0	58	47.94	3.01	0.68	3.14	49.24	5.38	3.84	0.5	0.74	0.5	0.53	0.55	0.04
				(40.92)	(4.58)	(0.44)	(3.07)	(13.85)	(2.18)	(1.07)	(0.5)	(0.44)	(0.5)	(0.5)	(0.5)	(0.09)
		1	33	95.16	1.64	0.58	4.78	48.39	6.03	7.3	0.27	0.82	0.79	0.52	0.48	0.07
				(135.39)	(1.69)	(0.21)	(3.86)	(13.43)	(1.98)	(1.1)	(0.45)	(0.39)	(0.42)	(0.51)	(0.51)	(0.1)
Imdibir	Round 2/3	0	56	41.85	0.24	0.02	1.8	48.21	7.46	3.09	0.14	0.21	0.82	0.27	0.5	0.31
				(78.51)	(0.59)	(0.01)	(1.7)	(12.55)	(2.89)	(1.42)	(0.35)	(0.41)	(0.39)	(0.45)	(0.5)	(0.18)
		1	7	30.14	0.3	0.04	5.07	55.71	9.43	6.57	0.14	0.14	0.86	0.14	0.71	0.22
				(24.54)	(0.79)	(0.03)	(7.74)	(13.77)	(2.44)	(1.13)	(0.38)	(0.38)	(0.38)	(0.38)	(0.49)	(0.11)
	Round 4	0	54	44.22	0.74	0.02	2.03	49.41	7.33	3.09	0.19	0.2	0.74	0	0.39	0.24
				(84.03)	(3.86)	(0.02)	(2.02)	(12.63)	(3.11)	(1.44)	(0.39)	(0.41)	(0.44)	(0)	(0.49)	(0.1)
		1	7	59.76	0	0.04	2.91	57.71	8.57	6.57	0.14	0	0.86	0	0.29	0.23
				(57.9)	(0)	(0.04)	(1.19)	(13.77)	(1.72)	(1.13)	(0.38)	(0)	(0.38)	(0)	(0.49)	(0.08)
Aze Deboa	Round 6	0	45	46.03	1.03	0.15	2.82	53.24	7.76	4.27	0.27	0.31	0.76	0.47	0.27	0.27
				(99.44)	(5.76)	(0.2)	(1.62)	(12.74)	(2.3)	(0.89)	(0.45)	(0.47)	(0.43)	(0.5)	(0.45)	(0.24)
		1	13	28.53	0.09	0.09	2.4	48.62	7.85	7.38	0.23	0.23	0.62	0.23	0.38	0.15
				(30.28)	(0.18)	(0.04)	(1.79)	(13.27)	(1.91)	(1.26)	(0.44)	(0.44)	(0.51)	(0.44)	(0.51)	(0.24)
Gara Godo	Round 4	0	79	28.46	0.8	0.13	1.49	46.85	6.42	3.72	0.27	0.11	0.71	0.01	0.09	0.23
				(62.98)	(3.17)	(0.11)	(1.13)	(13.45)	(2.73)	(1.45)	(0.44)	(0.32)	(0.46)	(0.11)	(0.29)	(0.19)
		1	10	19.05	0.26	0.09	1.63	58.1	7.9	7.1	0.2	0.2	0.8	0	0.2	0.18
				(13.2)	(0.79)	(0.07)	(1.43)	(14.71)	(3.84)	(1.29)	(0.42)	(0.42)	(0.42)	(0)	(0.42)	(0.25)
	Round 6	0	75	29.52	0.26	0.14	1.74	51.39	5.36	3.79	0.29	0.28	0.67	0.13	0.09	0.36
				(26.98)	(0.73)	(0.08)	(1.07)	(14.39)	(1.88)	(1.41)	(0.46)	(0.45)	(0.47)	(0.34)	(0.29)	(0.24)
		1	10	35.37	0.12	0.14	2.19	61.3	5.8	7.1	0.2	0.4	0.7	0	0.4	0.24
				(27.43)	(0.17)	(0.07)	(1.22)	(15.76)	(3.05)	(1.29)	(0.42)	(0.52)	(0.48)	(0)	(0.52)	(0.16)
Doma	Round 2/3	0	47	16.35	3.92	0.53	1.26	40.62	5.85	3.94	0.06	0.98	0.81	0.64	0.36	0.29
				(20.36)	(3.48)	(0.41)	(1.78)	(14.78)	(2.45)	(1.07)	(0.25)	(0.15)	(0.4)	(0.49)	(0.49)	(0.25)
		1	12	12.27	4.11	0.88	1.05	34.17	4.08	7	0	0.92	0.58	0.67	0.42	0.34
				(10.8)	(3.2)	(0.69)	(1.39)	(13.91)	(2.64)	(0.85)	(0)	(0.29)	(0.51)	(0.49)	(0.51)	(0.21)
	Round 5	0	33	9.74	1.03	0.36	2.83	40.52	5.88	4.21	0.06	0.45	0.85	0.03	0.09	0.25
				(8.68)	(2.57)	(0.31)	(2.21)	(11.26)	(2.38)	(0.93)	(0.24)	(0.51)	(0.36)	(0.17)	(0.29)	(0.2)
		1	11	10.62	1.22	0.44	1.21	37.09	4.73	7	0	0.45	0.82	0	0.27	0.31
				(10.06)	(1.81)	(0.47)	(0.9)	(14.05)	(2.28)	(0.89)	(0)	(0.52)	(0.4)	(0)	(0.47)	(0.17)
D.B. -Milki	Round 5	0	83	51.35	8.18	0.68	5.96	52.46	5.47	4.31	0.27	0.46	0.59	0	0.13	0.05
				(38.05)	(10.94)	(0.48)	(3.08)	(16.47)	(2.11)	(0.92)	(0.44)	(0.5)	(0.49)	(0)	(0.34)	(0.08)
		1	76	59.22	5.49	0.71	6.87	51.57	6.01	6.96	0.21	0.3	0.72	0	0.13	0.05
				(39.6)	(10.45)	(0.55)	(3.43)	(15.7)	(2.34)	(0.97)	(0.41)	(0.46)	(0.45)	(0)	(0.34)	(0.07)

Source: Ethiopian Rural Survey

Table 6: Descriptive Statistics by Gender

			Means													
Village	**Round**	**FemaleHd**	**No. of HHS.**	**Income**	**Aidpc**	**Landpc**	**LSU**	**AgeHD**	**HHsize**	**Ladder**	**Power**	**Aid**	**Married**	**FFW**	**Wage Labor**	**Crop Shocks**
Haresaw	Round 5	0	32	22.03	1.72	0.13	2.83	56.06	6.56	4.75	0.34	0.31	0.91	0.38	0.06	0.23
				(18.61)	(3.22)	(0.07)	(1.78)	(12.18)	(2.61)	(1.72)	(0.48)	(0.47)	(0.3)	(0.49)	(0.25)	(0.17)
		1	28	18.09	4.18	0.17	1.43	43.32	4.54	5	0.39	0.32	0.18	0.25	0.07	0.26
				(23.29)	(7.33)	(0.12)	(1.26)	(16.23)	(2.46)	(1.68)	(0.5)	(0.48)	(0.39)	(0.44)	(0.26)	(0.16)
	Round 6	0	32	8.58	0.72	0.12	2.95	59	6.31	4.94	0.38	0.25	0.88	0.28	0.09	0.13
				(6.77)	(1.53)	(0.06)	(1.89)	(12.73)	(2.21)	(1.76)	(0.49)	(0.44)	(0.34)	(0.46)	(0.3)	(0.13)
		1	37	9.3	2.17	0.15	1.52	46.3	4.7	4.95	0.38	0.43	0.19	0.19	0.05	0.13
				(10.54)	(3.73)	(0.15)	(1.43)	(18.1)	(2.5)	(1.7)	(0.49)	(0.5)	(0.4)	(0.4)	(0.23)	(0.14)
Geblen	Round 2/3	0	31	9	3.39	0.07	1.88	56.94	6.68	5.48	0.52	0.84	0.94	0	0	0.22
				(5.71)	(5.11)	(0.06)	(1.23)	(14.27)	(2.59)	(1.63)	(0.51)	(0.37)	(0.25)	(0)	(0)	(0.19)
		1	26	8.75	4.59	0.07	0.56	52.46	4.31	5.19	0.46	0.96	0.08	0	0	0.25
				(7.7)	(4.05)	(0.1)	(0.75)	(19.91)	(2.02)	(2.21)	(0.51)	(0.2)	(0.27)	(0)	(0)	(0.21)
	Round 4	0	32	5.77	2.38	0.07	2.96	58.75	6.56	5.47	0.5	0.66	0.94	0.06	0.09	0.05
				(10.05)	(2.77)	(0.03)	(1.81)	(14.08)	(2.38)	(1.61)	(0.51)	(0.48)	(0.25)	(0.25)	(0.3)	(0.14)
		1	24	5.42	3.36	0.05	1.71	55.21	4.83	5.17	0.46	0.67	0.08	0	0	0.08
				(8.22)	(2.89)	(0.02)	(1.16)	(19.48)	(1.66)	(2.26)	(0.51)	(0.48)	(0.28)	(0)	(0)	(0.13)
	Round 5	0	28	9.21	0.6	0.05	3.17	60.43	6.64	5.57	0.54	0.25	0.93	0.36	0.14	0.14
				(9.97)	(1.18)	(0.03)	(1.27)	(14.14)	(2.48)	(1.6)	(0.51)	(0.44)	(0.26)	(0.49)	(0.36)	(0.2)
		1	27	6.52	0.59	0.06	2.39	56.37	4.85	5.15	0.44	0.26	0.07	0.15	0.11	0.19
				(9.79)	(1.12)	(0.04)	(1.43)	(17.82)	(1.94)	(2.16)	(0.51)	(0.45)	(0.27)	(0.36)	(0.32)	(0.22)
	Round 6	0	25	8.97	3.8	0.08	2.65	61.76	6.6	5.92	0.64	0.68	0.96	0.16	0.28	0.03
				(8.32)	(3.38)	(0.07)	(1.4)	(13.14)	(2.36)	(1.63)	(0.49)	(0.48)	(0.2)	(0.37)	(0.46)	(0.05)
		1	15	9.05	3.3	0.11	1.93	56.33	4.4	5.13	0.4	0.47	0.2	0.13	0.2	0.03
				(8.53)	(4.66)	(0.07)	(1.75)	(17.46)	(2.59)	(2)	(0.51)	(0.52)	(0.41)	(0.35)	(0.41)	(0.06)
Dinki	Round 2/3	0	61	7.83	6.27	0.39	1.48	44.15	4.79	5.34	0.46	0.84	0.79	0	0.56	0.11
				(13.25)	(3.58)	(0.36)	(1.58)	(14.4)	(2.32)	(1.67)	(0.5)	(0.37)	(0.41)	(0)	(0.5)	(0.14)
	Round 5	0	58	25.67	1.13	0.28	2.91	45.5	5.41	5.47	0.47	0.21	0.84	0.02	0.1	0.11
				(22.12)	(2.55)	(0.22)	(2.29)	(14.49)	(2.49)	(1.64)	(0.5)	(0.41)	(0.37)	(0.13)	(0.31)	(0.1)
		1	2	16.06	0	0.26	2.63	26	7	4.5	0.5	0	0	0	0.5	0.1
				(8.28)	(0)	(0.12)	(0.6)	(11.31)	(4.24)	(2.12)	(0.71)	(0)	(0)	(0)	(0.71)	(0.04)
	Round 6	0	61	38.67	1.2	0.3	2.86	51.21	4.97	5.28	0.43	0.49	0.87	0.18	0.48	0.19
				(23.34)	(1.74)	(0.23)	(2.31)	(16.39)	(2.17)	(1.7)	(0.5)	(0.5)	(0.34)	(0.39)	(0.5)	(0.2)
		1	7	34.83	1.23	0.27	1.43	52.14	3.57	5.29	0.43	0.57	0.14	0	0.43	0.12
				(30.01)	(1.5)	(0.2)	(1.66)	(18.22)	(0.79)	(1.98)	(0.53)	(0.53)	(0.38)	(0)	(0.53)	(0.13)
Shumsha	Round 1	0	74	17.82	11.16	0.48	2.7	45.47	5.03	4.65	0.35	0.96	0.95	0	0.14	0.28
				(20.76)	(6.94)	(0.37)	(1.83)	(13.69)	(2)	(1.93)	(0.48)	(0.2)	(0.23)	(0)	(0.34)	(0.22)
		1	32	16.94	7.86	0.42	0.65	45.59	3.31	4.13	0.22	0.97	0.13	0	0.13	0.29
				(35.03)	(5.37)	(0.45)	(0.91)	(12.39)	(1.67)	(1.95)	(0.42)	(0.18)	(0.34)	(0)	(0.34)	(0.22)
	Round 2/3	0	70	27.01	14.56	0.37	2.78	46.36	5.29	4.63	0.34	0.91	0.97	0.04	0.23	0.16
				(28.17)	(19.72)	(0.26)	(2)	(13.73)	(1.96)	(1.9)	(0.48)	(0.28)	(0.17)	(0.2)	(0.42)	(0.18)
		1	22	33.66	16.85	0.34	0.84	47.59	2.95	4.32	0.27	0.91	0.14	0	0.14	0.16
				(37.75)	(12.94)	(0.28)	(0.91)	(12.61)	(1.33)	(2.08)	(0.46)	(0.29)	(0.35)	(0)	(0.35)	(0.15)
	Round 4	0	63	36.4	1.25	0.41	3.37	48.57	5.37	4.67	0.35	0.44	0.92	0	0.4	0.2
				(43.03)	(2.83)	(0.26)	(1.89)	(13.46)	(2.16)	(1.9)	(0.48)	(0.5)	(0.27)	(0)	(0.49)	(0.17)
		1	26	34.29	5.4	0.35	1.92	47.62	3.35	4.23	0.27	0.62	0.15	0	0.27	0.19
				(48.5)	(12.88)	(0.28)	(2.58)	(11.8)	(1.7)	(2.12)	(0.45)	(0.5)	(0.37)	(0)	(0.45)	(0.12)
	Round 5	0	58	39.04	0.79	0.24	3.44	50.17	5.52	5.02	0.41	0.16	0.91	0.26	0.36	0.09
				(41)	(2.8)	(0.19)	(1.94)	(13.92)	(2.15)	(1.83)	(0.5)	(0.37)	(0.28)	(0.44)	(0.48)	(0.13)
		1	18	32.16	0.16	0.43	1.94	47.67	4.28	3.61	0.17	0.11	0.17	0.22	0.11	0.09
				(16.36)	(0.49)	(0.34)	(1.42)	(12.95)	(2.4)	(1.94)	(0.38)	(0.32)	(0.38)	(0.43)	(0.32)	(0.13)
	Round 6	0	43	39.91	0.82	0.26	3.81	51.84	5.84	4.91	0.4	0.56	0.86	0.33	0.4	0.22
				(21.05)	(1)	(0.22)	(2.02)	(11.02)	(2.07)	(1.74)	(0.49)	(0.5)	(0.35)	(0.47)	(0.49)	(0.23)
		1	35	35.76	2.07	0.36	1.42	54.89	3.69	3.57	0.14	0.63	0.09	0.03	0.34	0.21
				(28.28)	(2.46)	(0.26)	(1.25)	(13.62)	(1.73)	(1.33)	(0.36)	(0.49)	(0.28)	(0.17)	(0.48)	(0.25)

Source: Ethiopian Rural Survey

Continued

Table 6: Descriptive Statistics by Gender

			Means												
Village	**Round**	**FemaleHd**	**No. of HHS.**	**Income**	**Aidpc**	**Landpc**	**LSU**	**AgeHD**	**HHsize**	**Ladder**	**Power**	**Aid**	**Married**	**FFW**	**Wage Labor**	**Crop Shocks**
Adele Keke	Round 4	0	64	67.18	1.74	0.28	1.91	46.48	6.77	5.92	0.58	0.59	0.89	0.02	0.25	0.18
				(65.07)	(2.13)	(0.29)	(1.4)	(14.98)	(2.95)	(2.02)	(0.5)	(0.5)	(0.31)	(0.13)	(0.44)	(0.15)
		1	20	40.77	1.77	0.28	1.76	48.45	5.7	5.75	0.5	0.7	0.15	0	0.25	0.12
				(26.39)	(1.64)	(0.18)	(1.34)	(11.62)	(1.72)	(2.05)	(0.51)	(0.47)	(0.37)	(0)	(0.44)	(0.11)
	Round 6	0	54	69.07	1.75	0.22	1.8	50.63	7.06	5.56	0.56	0.28	0.8	0.11	0.24	0.17
				(64.21)	(5.97)	(0.11)	(1.49)	(12.74)	(2.38)	(1.89)	(0.5)	(0.45)	(0.41)	(0.32)	(0.43)	(0.22)
		1	24	62.47	1.26	0.23	1.61	47.71	5.5	6.75	0.67	0.38	0.08	0.17	0.13	0.22
				(53.25)	(1.92)	(0.19)	(1.61)	(14.95)	(2.23)	(2.13)	(0.48)	(0.49)	(0.28)	(0.38)	(0.34)	(0.17)
Korodegaga	Round 1	0	66	26.21	0.42	0.58	3.81	45.76	6.83	5.11	0.36	0.14	0.94	0	0.52	0.22
				(40.6)	(1.25)	(0.26)	(2.89)	(13.41)	(2.43)	(1.9)	(0.48)	(0.35)	(0.24)	(0)	(0.5)	(0.25)
		1	26	14.31	0.34	0.47	3.23	38.73	6.04	4.88	0.31	0.19	0.38	0	0.23	0.14
				(8.04)	(0.91)	(0.22)	(5.18)	(7.9)	(2.27)	(2.16)	(0.47)	(0.4)	(0.5)	(0)	(0.43)	(0.22)
	Round 2/3	0	65	36.08	16.38	0.61	3.5	46.69	6.69	5.12	0.37	1	0.92	0	0.29	0.05
				(17.39)	(12.52)	(0.3)	(2.54)	(13.5)	(2.83)	(1.91)	(0.49)	(0)	(0.27)	(0)	(0.46)	(0.08)
	Round 2/3	1	25	25.66	15.07	0.53	3.38	39.68	6.12	4.76	0.28	1	0.44	0	0.08	0.04
				(11.43)	(7.84)	(0.22)	(5.47)	(8.18)	(1.88)	(2.01)	(0.46)	(0)	(0.51)	(0)	(0.28)	(0.06)
	Round 6	0	53	63.43	2.68	0.67	4.47	53.25	6.06	5.42	0.45	0.74	0.85	0.47	0.49	0.07
				(68.6)	(4.47)	(0.44)	(4.04)	(13.61)	(2.25)	(1.91)	(0.5)	(0.45)	(0.36)	(0.5)	(0.5)	(0.11)
		1	38	67.34	2.28	0.6	2.7	42.92	5	4.66	0.24	0.82	0.26	0.61	0.58	0.04
				(114.36)	(2.77)	(0.25)	(2.03)	(11.31)	(1.77)	(2.04)	(0.43)	(0.39)	(0.45)	(0.5)	(0.5)	(0.06)
Imdibir	Round 2/3	0	54	43.29	0.29	0.03	2.29	48.98	7.87	3.46	0.11	0.24	0.96	0.22	0.59	0.3
				(79.56)	(0.65)	(0.02)	(3.26)	(13.03)	(2.98)	(1.82)	(0.32)	(0.43)	(0.19)	(0.42)	(0.5)	(0.18)
		1	9	24.15	0	0.02	1.44	49.44	6.56	3.56	0.11	0	0	0.44	0.11	0.31
				(25.39)	(0)	(0.01)	(1.53)	(11.97)	(2.07)	(1.51)	(0.33)	(0)	(0)	(0.53)	(0.33)	(0.21)
	Round 4	0	50	53.3	0.8	0.03	2.35	50.86	7.64	3.46	0.12	0.22	0.92	0	0.42	0.24
				(88.13)	(4.01)	(0.02)	(2.05)	(13.4)	(3.14)	(1.88)	(0.33)	(0.42)	(0.27)	(0)	(0.5)	(0.11)
		1	11	12.88	0	0.02	1.13	48.09	6.73	3.64	0.09	0	0	0	0.18	0.2
				(7.15)	(0)	(0.02)	(1.02)	(10.74)	(2.2)	(1.43)	(0.3)	(0)	(0)	(0)	(0.4)	(0.07)
Aze Deboa	Round 6	0	43	41.27	1.05	0.13	2.74	52.19	8.23	5.05	0.23	0.28	0.91	0.49	0.26	0.27
				(100.31)	(5.9)	(0.2)	(1.65)	(12.4)	(2.09)	(1.65)	(0.43)	(0.45)	(0.29)	(0.51)	(0.44)	(0.25)
		1	15	44.51	0.18	0.14	2.68	52.27	6.47	4.73	0.2	0.33	0.2	0.2	0.4	0.16
				(43.51)	(0.31)	(0.09)	(1.7)	(14.68)	(2.03)	(1.62)	(0.41)	(0.49)	(0.41)	(0.41)	(0.51)	(0.2)
Gara Godo	Round 4	0	66	20.64	0.79	0.11	1.48	47.44	6.85	4.12	0.12	0.14	0.95	0.02	0.11	0.22
				(21.06)	(3.1)	(0.06)	(1.06)	(14.42)	(3.03)	(1.85)	(0.33)	(0.35)	(0.21)	(0.12)	(0.31)	(0.19)
		1	23	46.81	0.57	0.17	1.57	50.04	5.83	4.04	0.09	0.09	0.04	0	0.09	0.24
				(111.04)	(2.72)	(0.16)	(1.43)	(12.69)	(2.33)	(1.61)	(0.29)	(0.29)	(0.21)	(0)	(0.29)	(0.21)
	Round 6	0	61	32.53	0.25	0.13	1.86	50.67	5.74	4.26	0.13	0.26	0.9	0.15	0.18	0.32
				(28.49)	(0.78)	(0.08)	(1.16)	(15.46)	(2.1)	(1.91)	(0.34)	(0.44)	(0.3)	(0.36)	(0.39)	(0.23)
		1	24	24.32	0.22	0.14	1.65	57.33	4.58	3.96	0.08	0.38	0.08	0.04	0	0.41
				(21.92)	(0.33)	(0.08)	(0.87)	(12.02)	(1.59)	(1.27)	(0.28)	(0.49)	(0.28)	(0.2)	(0)	(0.24)
Doma	Round 2/3	0	56	15.67	4.02	0.61	1.23	39.54	5.52	4.63	0.21	0.96	0.8	0.66	0.39	0.31
				(19.11)	(3.46)	(0.5)	(1.72)	(15.03)	(2.57)	(1.6)	(0.41)	(0.19)	(0.4)	(0.48)	(0.49)	(0.24)
		1	3	12.64	2.79	0.44	1.07	35	5	3.33	0	1	0	0.33	0	0.15
				(14.03)	(2.09)	(0.51)	(1.67)	(6.56)	(3)	(1.53)	(0)	(0)	(0)	(0.58)	(0)	(0.17)
	Round 5	0	42	10.21	1.11	0.39	2.33	39.6	5.52	4.9	0.26	0.45	0.88	0.02	0.14	0.27
				(9.07)	(2.43)	(0.36)	(2.04)	(12.06)	(2.41)	(1.56)	(0.45)	(0.5)	(0.33)	(0.15)	(0.35)	(0.19)
		1	2	4.75	0.38	0.21	4.5	41	7	5	0	0.5	0	0	0	0.1
				(0.45)	(0.53)	(0.15)	(2.83)	(12.73)	(1.41)	(0)	(0)	(0.71)	(0)	(0)	(0)	(0.15)
D.B. -Milki	Round 5	0	121	57.35	5.56	0.63	6.81	51.26	6.09	5.67	0.5	0.3	0.81	0	0.14	0.05
				(39.87)	(10.67)	(0.42)	(3.36)	(16.25)	(2.26)	(1.56)	(0.5)	(0.46)	(0.39)	(0)	(0.35)	(0.08)
		1	38	47.99	11.16	0.9	5.1	54.47	4.58	5.29	0.42	0.66	0.16	0	0.11	0.05
				(35.07)	(10.02)	(0.69)	(2.64)	(15.39)	(1.73)	(1.81)	(0.5)	(0.48)	(0.37)	(0)	(0.31)	(0.07)

Source: Ethiopian Rural Survey

Table 7: Determinants of Food Aid Allocations: Marginal Effects From Probit

	probit1	**probit2**	**probit3**	**probit4**	**probit5**	**probit6**	**probit7**	**probit8**
Log Income PC	-0.074***	-0.051	-0.031	-0.026	-0.074***	-0.051	-0.030	-0.026
	(0.024)	(0.033)	(0.019)	(0.021)	(0.024)	(0.033)	(0.019)	(0.021)
Livestock units	-0.026**	-0.028**	-0.020	-0.023*	-0.026**	-0.028**	-0.020	-0.023*
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Female head	0.062**	0.070*	0.099**	0.073*	0.062**	0.071*	0.101**	0.074*
	(0.026)	(0.041)	(0.043)	(0.041)	(0.025)	(0.040)	(0.042)	(0.039)
Crop Shock	-0.101	-0.066	-0.249***	-0.183**	-0.089	-0.006	-0.176**	-0.101
	(0.119)	(0.125)	(0.073)	(0.079)	(0.122)	(0.129)	(0.084)	(0.095)
power	0.051	0.019	0.025	0.025	0.058	0.050	0.065	0.068
	(0.040)	(0.031)	(0.037)	(0.036)	(0.048)	(0.041)	(0.054)	(0.054)
power*shockc					-0.042	-0.191	-0.250**	-0.277**
					(0.120)	(0.122)	(0.119)	(0.129)
age of household head	0.003**	0.002**	0.003*	0.003*	0.003**	0.002**	0.003*	0.003*
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
household size	-0.040**	-0.020	-0.028**	-0.024*	-0.040**	-0.020	-0.028**	-0.024*
	(0.016)	(0.012)	(0.013)	(0.012)	(0.016)	(0.012)	(0.013)	(0.013)
Log Land PC (HA)	0.498***	0.412***	0.405***	0.251**	0.499***	0.410***	0.407***	0.248**
	(0.149)	(0.072)	(0.094)	(0.106)	(0.149)	(0.073)	(0.094)	(0.108)
Food For Work	0.052	0.060	0.089	0.010	0.052	0.060	0.090	0.010
	(0.131)	(0.130)	(0.071)	(0.072)	(0.131)	(0.129)	(0.070)	(0.070)
Outside Employment	0.077	0.075	0.109***	0.062	0.077	0.074	0.110***	0.063
	(0.048)	(0.052)	(0.030)	(0.039)	(0.048)	(0.052)	(0.030)	(0.038)
Num. of Kids	0.035	0.018	0.033	0.030	0.036	0.019	0.033	0.030
	(0.023)	(0.020)	(0.023)	(0.021)	(0.022)	(0.020)	(0.023)	(0.021)
Num. of Elders	0.003	0.008	0.004	0.006	0.003	0.009	0.005	0.007
	(0.043)	(0.041)	(0.039)	(0.041)	(0.043)	(0.041)	(0.039)	(0.041)
married	0.071*	0.052**	0.049	0.032	0.071*	0.052**	0.049	0.031
	(0.041)	(0.026)	(0.035)	(0.032)	(0.041)	(0.026)	(0.034)	(0.031)
Village Dummies	No	Yes	No	Yes	No	Yes	No	Yes
Time-Varying Village Effects	No	No	Yes	Yes	No	No	Yes	Yes
Pseudo R-squared	0.07	0.12	0.25	0.27	0.07	0.12	0.25	0.27
Log Likelihood	-1243.43	-1176.55	-1004.17	-979.54	-1243.38	-1175.68	-1002.94	-978.11
Obs.	1930	1930	1930	1930	1930	1930	1930	1930

Significance levels : * : 10% ** : 5% *** : 1%

Notes: Robust Standard Errors in Parentheses. Clustered at the village level. Includes only villages which received aid. The Table reports marginal effects as the derivative of the cumulative normal distribution at the mean of the right hand side variables; for dummies the marginal effect expressed as the discrete change from 0 to 1 is reported. Dependent Variable is 1 if household received aid 0 otherwise.

Table 8: Determinants of Food Aid Allocations: OLS

	OLS1	OLS2	OLS3	OLS4	OLS5	OLS6	OLS7	OLS8
Log Income PC	-0.027	-0.042	0.020	0.036	-0.027	-0.042	0.019	0.037
	(0.041)	(0.042)	(0.038)	(0.035)	(0.043)	(0.042)	(0.038)	(0.035)
Livestock units	0.010	-0.024**	0.014	-0.004	0.011	-0.024**	0.015	-0.004
	(0.016)	(0.011)	(0.017)	(0.007)	(0.016)	(0.011)	(0.017)	(0.006)
Female head	-0.067	-0.229***	-0.075	-0.128*	-0.070	-0.229***	-0.076	-0.127*
	(0.066)	(0.067)	(0.085)	(0.064)	(0.064)	(0.067)	(0.083)	(0.063)
Crop Shock	-0.313	-0.091	-0.348	0.069	-0.571*	-0.091	-0.513**	-0.054
	(0.297)	(0.141)	(0.223)	(0.111)	(0.277)	(0.141)	(0.220)	(0.122)
power	0.038	-0.057	0.062	-0.002	-0.088	-0.057	-0.021	-0.064
	(0.064)	(0.074)	(0.055)	(0.041)	(0.076)	(0.074)	(0.076)	(0.040)
pow_shockc		0.522*			0.818***	0.522*	0.539**	0.408**
		(0.238)			(0.243)	(0.238)	(0.231)	(0.172)
age of household head	-0.003	-0.003*	0.001	0.003**	-0.003	-0.003*	0.001	0.003**
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
household size	-0.095**	-0.081***	-0.092***	-0.096***	-0.095**	-0.081***	-0.092***	-0.096***
	(0.036)	(0.018)	(0.019)	(0.014)	(0.037)	(0.018)	(0.019)	(0.014)
Log Land PC (HA)	1.084***	0.411***	0.747*	0.160	1.076***	0.411***	0.739*	0.162*
	(0.244)	(0.105)	(0.374)	(0.089)	(0.242)	(0.105)	(0.372)	(0.087)
Food For Work	-0.603**	-0.468	-0.386	-0.159	-0.600**	-0.468	-0.387	-0.160
	(0.237)	(0.324)	(0.218)	(0.118)	(0.238)	(0.324)	(0.219)	(0.121)
Outside Employment	-0.323***	-0.266**	-0.199**	-0.086***	-0.324***	-0.266**	-0.201**	-0.088***
	(0.074)	(0.088)	(0.078)	(0.027)	(0.074)	(0.088)	(0.078)	(0.027)
Num. of Kids	0.035	0.014	0.028	0.013	0.035	0.014	0.028	0.013
	(0.029)	(0.021)	(0.021)	(0.018)	(0.029)	(0.021)	(0.021)	(0.018)
Num. of Elders	-0.033	-0.045	-0.020	-0.074**	-0.040	-0.045	-0.024	-0.078**
	(0.038)	(0.046)	(0.023)	(0.031)	(0.039)	(0.046)	(0.024)	(0.032)
married	0.070	0.029	-0.071	-0.071	0.075	0.029	-0.067	-0.068
	(0.072)	(0.053)	(0.053)	(0.055)	(0.067)	(0.053)	(0.050)	(0.053)
Constant	2.264***	3.495***	1.712***	3.028***	2.294***	3.495***	1.741***	3.039***
	(0.132)	(0.146)	(0.286)	(0.143)	(0.134)	(0.146)	(0.285)	(0.140)
Village Dummies	No	Yes	No	Yes	No	Yes	No	Yes
Time-Varying Village Effects	No	No	Yes	Yes	No	No	Yes	Yes
R-squared	0.25	0.37	0.48	0.64	0.26	0.37	0.48	0.64
Obs.	1018	1018	1018	1018	1018	1018	1018	1018

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

Notes: Robust Standard Errors in Parentheses. Clustered at the village level. Sample only includes households which received aid. Dependent Variable is the log of aid per capita.

Table 9: Determinants of Food Aid Allocations: Random and Fixed Effects

	Random Effects		Fixed Effects	
	Marginal Effect	**SE**	**Marginal Effect**	**SE**
Income	0.022	(0.057)	0.046	(0.077)
Livestock units	-0.017	(0.012)	-0.010	(0.013)
Female head	-0.084	(0.077)	-0.103	(0.147)
shockc	-0.312**	(0.152)	-0.369	(0.234)
pow_shockc	0.397***	(0.093)	0.607**	(0.215)
age of household head	0.005***	(0.001)	-0.001	(0.006)
household size	-0.096***	(0.012)	-0.133***	(0.026)
Land Per Capita	0.126	(0.192)	0.141	(0.122)
Food For Work	-0.202*	(0.104)	-0.272	(0.148)
Outside Employment	-0.087***	(0.024)	-0.077**	(0.028)
Num. of Kids	0.020	(0.014)	0.030	(0.018)
Num. of Elders	-0.059*	(0.031)	-0.078	(0.059)
married	-0.039	(0.077)	0.019	(0.105)
Constant	1.547***	(0.342)	1.934***	(0.553)
Time-Varying Village Effects	Yes		Yes	
R-squared			0.62	
Obs.	717		717	
Num. of Groups	299		299	
F-test that all u_i=0 (p-value):			0.97	(0.6051)
Hausman Test				
chi-squared		67.77		
p-value		0.0001		

Significance levels : * : 10% ** : 5% *** : 1%

Notes: Robust Standard Errors in Parentheses. Clustered at the village level. Includes only villages and households which received aid at least twice. Dependent Variable is the log of aid per capita.

Table 10: Determinants of Food Aid Allocations: Marginal Effects From Probit

	probit1		probit2	
	Marginal Effect	**SE**	**Marginal Effect**	**SE**
Income	-0.017	(0.020)	-0.016	(0.020)
Livestock units	-0.013**	(0.006)	-0.013**	(0.006)
Female head	0.008	(0.020)	0.009	(0.020)
power	-0.001	(0.018)	0.083	(0.136)
shockc	-0.294***	(0.075)	-0.290***	(0.075)
age of household head	0.001**	(0.001)	0.001**	(0.001)
household size	-0.011	(0.015)	-0.011	(0.015)
Land Per Capita	0.259**	(0.147)	0.263**	(0.146)
Food For Work	-0.055	(0.055)	-0.055	(0.054)
Outside Employment	0.066**	(0.032)	0.064**	(0.032)
Num. of Kids	0.010	(0.010)	0.011	(0.010)
Num. of Elders	-0.011	(0.025)	-0.013	(0.025)
married	0.041	(0.037)	0.043	(0.036)
Village Population (000)	-0.007	(0.014)	-0.006	(0.014)
Dist. to Town	0.005	(0.004)	0.005	(0.004)
FFW Present	0.172*	(0.092)	0.171*	(0.092)
Rain (m)	-0.154	(0.107)	-0.174*	(0.111)
power*rain			0.065	(0.062)
Log Vill. Income PC	-0.100**	(0.046)	-0.082*	(0.050)
power*vill_inc			-0.043	(0.027)
Pseudo R-squared	0.13		0.13	
Log Likelihood	-2069.78		-2065.94	
Obs.	4366		4366	

Significance levels : * : 10% ** : 5% *** : 1%

Notes: Robust Standard Errors in Parentheses. Clustered at the village level. Includes only villages which received aid. The Table reports marginal effects as the derivative of the cumulative normal distribution at the mean of the right hand side variables; for dummies the marginal effect expressed as the discrete change from 0 to 1 is reported. Dependent Variable is 1 if household received aid 0 otherwise.

References

[Allingham and Sandmo, 1972] Allingham, M. G. and Sandmo, A. (1972). Income tax evasion: A theorectical analysis. *Journal of Public Economics*, 1.

[Barrett, 2001] Barrett, C. B. (2001). Does food aid stabilize food availability? *Economic Development and Cultural Change*, 49(2):335–349.

[Clay et al., 1999] Clay, D. C., Molla, D., and Habtewold, D. (1999). Food aid targeting in ethiopia: A study of who needs it and who gets it. *Food Policy*, 24:391–409.

[Dercon and Krishnan, 2000] Dercon, S. and Krishnan, P. (2000). Vulnerability, seasonality, and poverty in ethiopia. *Journal of Development Studies*, 36.

[Dercon and Krishnan, 2003] Dercon, S. and Krishnan, P. (2003). Food aid and informal insurance. *World Institute for Development Economics Research, Helsinki, Finland, Discussion Paper*, (2003/09).

[Jayne et al., 2002] Jayne, T., Strauss, J., Yamano, T., and Molla, D. (2002). Targeting of food aid in rural ethiopia: Chronic need or inertia. *Journal of Development Economics*, 68:247–288.

[Quisumbing, 2003] Quisumbing, A. R. (2003). Food aid and child nutrition in rural ethiopia. *World Development*, 31(7):1309–1324.

[Shapouri and Missiaen, 1990] Shapouri, S. and Missiaen, M. (1990). Food aid: Motivation and allocation criteria. *Foreign Agricultural Economic Report*, 240.

[Sharp, 1997] Sharp, K. (1997). *Targeting Food Aid in Ethiopia*. Save the Children Fund (UK), Addis Ababa.

[Zahariadis and Ward, 2000] Zahariadis, N. and Ward, R. T. J. B. (2000). U.s. food aid to subsaharan africa: Politics or philanthropy.