

HOW FAIR IS WORKFARE?**GENDER, PUBLIC WORKS, AND EMPLOYMENT IN RURAL ETHIOPIA**

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Abstract

This paper uses the Ethiopian Rural Household Survey to examine the gender dimensions of public works. The first part of the paper uses three rounds of a panel conducted in 1994/95 to explore the determinants of participation in, days worked, wages, and earnings from wage labor, food-for-work (FFW), and self-employment. The second part analyzes public works data collected in 1997, together with program data collected in 2003.

FFW operates in a similar fashion to other labor markets in Ethiopia, where female participation is low. Gender differences are important in the participation decision, but operate differently in different types of labor markets. Better-educated women are more likely to participate in the wage labor market, while higher livestock holdings diminish participation more for women. Females with more schooling are also more likely to participate in FFW. Men's and women's participation in FFW and self-employment responds differently to household and community shocks. After controlling for selection, in which gender plays an important role, gender disadvantages in the wage labor market and FFW are insignificant. Returns to schooling and height are consistently positive in both wage labor and FFW, suggesting returns to human capital investment, even in the low-skill labor markets of rural Ethiopia.

Program characteristics significantly affect participation, with differential effects on men and women. Participation, days worked, wages, and earnings vary according to the type of project. Relative to infrastructure projects, water, social services, and other projects decrease participation probabilities. Distance has a strong negative effect on women's participation relative to males.

1. Introduction

Public works or workfare programs provide short-term employment at low wages for unskilled and semi-skilled workers on labor-intensive projects such as road construction and maintenance, irrigation infrastructure, reforestation, and soil conservation (Subbarao 2001). They have been used across Asia, Africa, and Latin America to provide income transfers to the poor, to enable the poor to smooth consumption against income shocks, and to create assets by constructing much-needed infrastructure, which can also generate employment through second-round effects. Given their long history, it is no surprise that debates on public works continue to this day. Recurrent issues in public works are the pattern of participation, the timing and type of project creation, the possibility of leakage to non-target groups, the distribution of benefits from assets created, and the technical efficiency of the assets themselves (Clay 1986).

Recently, policymakers have begun to pay attention to the gender dimensions of this debate. The issue of gender differences in participation in public works program has arisen for a number of reasons. First, if public funds are used to provide safety net mechanisms, women should have equal access to such risk-coping opportunities (Swamy 2001). Second, there is a large and growing literature that resources in the hands of women have a larger favorable impact on household food security and investments in children's health, nutrition, and education (Haddad, Hoddinott, and Alderman 1997; Quisumbing 2004). Public works schemes may provide such resources to poor women, and the presence of "outside options" such as public employment schemes may improve women's bargaining power within the household. Third, if women are more vulnerable

to income and other shocks because of the absence of insurance mechanisms (e.g., lack of assets to be used as collateral, ill health, shorter duration of paid employment) there may even be justification for targeting such employment opportunities to women.

In a review of the gender dimensions of public works programs, Swamy (2001) identifies three issues related to women's access to the direct and indirect benefits from public employment schemes: (1) whether or not women have equal access to direct wage employment benefits; (2) factors of design and implementation that determine women's participation; and (3) whether women benefit equally from the assets created by public works. However, the existing literature has very little evidence on these issues, partly because most public works studies have not been designed to look beyond quantifying men's and women's participation in public works, to the determinants of women's participation, especially programmatic factors that affect women's participation.

Are programs on the ground consistent with objectives to increase women's participation in the employment, income, and asset creation benefits of public works? What are the determinants of participation in public works, versus participation in other income-earning activities? Do men and women have equal probabilities of participation in such programs, controlling for other characteristics that may affect participation? Are the incentives to participate different for men and women? More important, are programs designed to encourage equal participation, and what program features are responsible for increasing women's participation?¹

¹ "Equal" participation may need to be defined as proportional to the number of men and women who are looking for work, since it is possible that a greater proportion of women will not be looking for places in public works programs. Alternatively, public works programs can be compared to other labor markets. We take the second approach in this paper.

This paper uses two related data sets from rural Ethiopia to examine the gender dimensions of public works. The first part of the paper uses data from three rounds of a panel conducted between 1994 and 1995 to explore the determinants of participation in, days worked, wages, and earnings from income-earning activities, including wage labor, food-for-work, and self-employment. By comparing participation in different types of off-farm labor market activities, we investigate whether food for work—the primary modality of public works implementation in Ethiopia—differs from other labor markets in terms of men’s and women’s participation and earnings. The second part of the paper uses a specially-designed module on public works that was administered in 1997 to the same survey households during the fourth round of the panel, in conjunction with program data collected from the communities in 2003. This module also delves more closely into the reasons for participation and non-participation in public works, and whether these reasons differ by gender.

2. Public Works, Food Aid, and Food for Work in Ethiopia

2.1 An overview of safety net mechanisms in Ethiopia

Discussions of public works cannot be isolated from food aid issues, especially in Ethiopia.² Public works, typically food-for-work (FFW) with part or whole payment in kind to project workers, have become the most important use of food aid (Dawson 1981;

² This paper does not deal with other relevant issues regarding food aid, such as targeting and program placement (Jayne et al. 2002), its effects on vulnerability (Dercon and Krishnan 2001), possible disincentive effects (Hoddinott 2003), and nutritional impacts (Yamano, Alderman, and Christiaensen 2003; Quisumbing 2003).

WFP/CFA 21/5 1986, cited in Clay 1986).³ This is especially true in Ethiopia, a drought-stricken economy with one of the lowest per capita incomes in the world, and the second largest recipient of food aid in the world (second to Bangladesh). Ethiopia's official food aid policy states that no able-bodied person should receive food aid without working on a community project in return, supplemented by targeted free food aid for those who cannot work. Free food distribution (FD) programs distribute cereals (wheat, maize, and sorghum) directly to households, while participants in FFW programs typically work in community development programs, such as roads, terraces, dams, and local infrastructure construction. Together, FFW and FD are virtually the only publicly provided safety net in Ethiopia (Dercon and Krishnan 2001). The government of Ethiopia's goal is to devote 80 percent of its food assistance resources to FFW programs, using the principle of self-targeting (FDRE 1996), although recent estimates indicate that only 63 percent of relief food was distributed through employment-generation schemes (Jayne et al. 2002).

In terms of program placement, the government distinguishes between two types of regions: (1) those in which the agricultural sector shows dynamism and potential for growth, and weather shocks are infrequent; and (2) those that are chronically subject to periodic monsoon failures (Subbarao and Smith 2003). Programs covering vulnerable groups are located in 156 *woredas* in four regions in the second group of regions, namely Oromiya, Amhara, Tigray, and SNNPR (Southern Nations and Nationalities People's Region).⁴ These four regions comprise over 80 percent of Ethiopia. Tigray is the most

³ Note, however, that some of the largest food-for-work programs, such as India's National Rural Employment Programme, state-level Employment Guarantee Schemes and Food-for-Work Programmes, have been financed from domestic sources (Clay 1986). In Africa, most public works programs are donor-funded.

⁴ The region is the largest regional unit in Ethiopia. Regions are disaggregated into zones, the next highest regional unit. *Woredas* are relatively small regional units that correspond to districts.

vulnerable to famine and food shortages, while most of the first type of region are found in Amhara, Oromiya, and SNNPR. Vulnerable *woredas* are identified using an Early Warning System that has evolved fairly efficiently over time. Within each *woreda*, households eligible for different programs are identified using both administrative and community targeting methods. Subbarao and Smith (2003) stress that these measures are intended to address transitional food insecurity caused by rainfall shortages. Initiatives aimed at chronic food insecurity are sparse on the ground and usually consist of donor-funded rural/agricultural development programs. The main area of focus and intervention has been on addressing short-term acute food shortages brought about by monsoon failures, mainly through the provision of relief food.

Four major safety net programs have been in operation in Ethiopia for quite some time: two that involve a work requirement, and two that do not. The first two are (1) food-for-work (FFW) and (2) employment generation schemes (EGS), both of which have work requirements, and the second two are (1) free food distribution (also called gratuitous relief) and (2) school feeding. A general distinction between FFW and EGS is that FFW projects secure a basic and steady activity level, while EGS provides additional inputs at times of increased need (WFP 1998: 13-14, quoted in Humphrey 1998).

Among the programs that involve a work requirement, FFW has had a longer history, having begun in 1980. The program is funded by WFP, and is carried out in selected vulnerable *woredas* in Tigray, SNNPR, Oromiya and Amhara. Except for Tigray, these regions are also surplus food producing regions in the country with pockets of food insecure or famine prone areas. Between 1999-2003, on average, over 1.4 million individuals participated annually in FFW. Each participant received a food

transfer (as wages) amounting to \$27.67. During this period, WFP donated food valued at \$35.6 million to the program, with a government counterpart of \$12.9 million (Subbarao and Smith 2003: 12). Thus, unlike EGS (discussed below), FFW involves greater government participation, is better coordinated, and has been sustained over a long period of time. FFW targets both geographic areas and households. It selects communities where the soil is degraded and deforested and where there is a shortage of water. Within these areas, application of targeting principles suggests that poor people would self-select themselves into the program when the program wage is lower than the market wage. In practice, where communities determine wages in FFW, they have not been set below the market wage, and sometimes even exceed it. Instead, days are rationed to provide employment opportunities for more households (Sharp 1997)—and thus it is not surprising that when the program wage exceeds the market wage, some non-poor farmers may also participate. Because the program by its very nature targets the able-bodied poor, it benefits labor-rich households, while some very poor households with no adult labor may not be able to benefit from the program.

The Employment Generation Program (also known as Employment Generation Scheme, EGS) was introduced more recently in 1993. According to most recent available estimates, the program expanded from 33 *woredas* and about 200,000 workers in September 2001 to 57 *woredas* and about 600,000 workers in April 2002. EGS has provided short-term employment to over 200,000 annually since 1997 (Subbarao and Smith 2003: 11). The Guidelines governing the EGS stipulate that 80 percent of all food aid is to be allocated to EGS activity, with the balance of 20 percent to be distributed without a work requirement to vulnerable groups who cannot provide physical labor in

exchange. The Guidelines also stipulate the wage rate (15 kg of food (wheat/maize) per person per month) and other norms for participation for pregnant and lactating women. In practice, a number of evaluations have pointed out that in most locations EGS degenerated into free distribution, and food meant for EGS was distributed without a work requirement, largely due to lack of any non-food budgetary support at the *woreda* to implement a workfare program (Subbarao and Smith 2003). Wage rates offered were generally lower than the stipulated 15 kg of food (wheat/maize) per person per month, with most participants never receiving more than 12.5 kg of food per person per month. Unlike FFW, the program operates almost entirely with donated food; the cost to the government is negligible.

2.2 Targeting and effectiveness of food aid

Although communities are supposed to be selected based on chronic need, one of the few systematic studies of program placement of food aid in Ethiopia found that food-aid allocations display a large degree of spatial rigidity over time, and are not necessarily concentrated among the poorest regions (Jayne et al. 2002). Contrary to the hypothesis that some regions are chronically needy, the study finds that needs shift geographically from one year to the next, but that fixed costs in setting up operations and in identifying needs lead to a degree of inertia in the location of food aid programs over time. Thus, having a food aid program in a community increases the probability that the program will continue, due to bureaucratic inertia.

Within communities, food aid is targeted using three methods: administrative targeting, using such indicators as asset or livestock ownership, age and gender, nutritional status, access to resources such as land and family labor; self-targeting,

typically implemented using wages below the market wage rate and “inferior” goods; and community-based targeting, based on community decisions about the eligibility of households to participate in food aid programs (Clay, Molla, and Habtewold 1999).

However, application of administrative criteria has been haphazard. Within these three broad approaches, criteria for the selection of participants ranged from reported poverty and the capacity to work, size of household plot, sometimes poverty alone, and certainly in some cases, the whims of the project coordinators (Humphrey 1998). Self-targeting has not also worked in practice. Although the wage rate has been fixed at a modest level of 3 kg of food per day (in some locations only 2.5 kg a day), some nonpoor participants have participated in workfare programs. Barrett, Holden, and Clay (2001) argue that the inclusion of nonpoor participants is not due to mismanagement, but to structural factors associated with imperfect factor markets in rural Ethiopia. Higher income households are endowed with more labor per unit of land or animal. Due to poor factor markets in land and livestock, these labor-abundant households have lower marginal labor productivity on their farms, depressing their own reservation wage rates so that they find low workfare wages rates acceptable.

In many cases, the desire to spread the benefits of FFW thinly has led communities to share individual rations among a large number of households (Sharp 1997). If quotas are small, for example, the local committee may cut the number of workplaces or rations given to each household rather than reduce the number of families assisted, so payments would no longer be directly linked to work effort. In some areas, FFW is also organized on a part-time basis so that participants can continue with farming

or other work. Able-bodied participants who are still farming could therefore devote less time to FFW and thus would earn less than those without outside activities.

Overall, it appears the mode and timeliness of payment are a greater problem than targeting. A norm of 3 kg of food and 120 g of oil per day is considered adequate to provide 1,800 calories to a family of six. In practice, some times and in some locations, only 2.5 kg of food was paid. In other locations oil was not provided. Participants who received oil typically sold their entire oil receipts and bought other food items such as salt, sugar and more grain, incurring significant transaction costs. Most female participants asked for more grain rather than oil. Nevertheless, most participants opted for food rather than cash as a mode of payment. Participants in the cash-for-works program implemented in the late 1980s often traveled long distances to buy food, and risked confiscation of their grain at check points on the return journey (Aytenu and Aylieff 1993). Delays in the payment of even these lower-than-norm wage payments were common; 76 percent of participants complained delays in payment (Humphrey 1998). Delays in payment can cause serious disruptions to beneficiaries and undermine the value of workfare as a safety net.

Despite the many criticisms unearthed by evaluations of food aid, food aid has been shown to reduce vulnerability. Dercon and Krishnan (2003), using a panel data set from Ethiopia, examine the extent to which food aid helps households smooth their consumption in the face of negative income shocks, while taking into account existing informal risk-sharing arrangements. Their results indicate positive effects of food aid on consumption-smoothing, though largely via intra-village risk sharing and not through direct targeting. In related work, Dercon and Krishnan (2001) find that the presence of a

food aid or FFW program in the village reduced the impact of a bad rainfall shock by 12 percent—a small but significant effect. Food aid (both FFW and FD) has positive nutritional impacts as well. Using a panel data set from rural Ethiopia, Quisumbing (2003) finds positive impacts of both FFW and FD on weight for height. Yamano, Alderman, and Christiaensen (2003), using three nationally-representative data sets from Ethiopia, find that food aid positively affects child growth, especially among 6-24 month olds who grew 1.6 cm faster on average in communities receiving food aid, than if no food aid had been available.

2.3 Gender dimensions of food aid

Despite the policy mandate of the World Food Programme (WFP), Ethiopia's major food aid donor, towards women, there has been relatively little econometric analysis of the gender dimensions of public works in Ethiopia.⁵ WFP has mandated that it will require women to control the family entitlement in 80 percent of WFP-handled and subcontracted operations, although actual practice suggests that most countries have not met this level (WFP 2003a). This issue has been largely unexamined owing to the scarcity of gender-disaggregated data on participation and earnings. Exceptions are studies by Yamano (2000) and Quisumbing (2003). Using nationally representative data from Ethiopia, Yamano (2000) finds that FD tends to increase farm labor supply of girls, while FFW decreases it. Another study using the same data set used in this paper (Quisumbing 2003) examined the impact of FFW and FD on child nutrition. The study

⁵ Program evaluations such as those by Humphrey (1998) and Sharp (1997) have paid attention to the gender dimensions of FFW, such as participation of men and women, women's preferred form of payment, and the intrahousehold distribution of workfare payments. Neither evaluation conducted econometric analyses of the gender impact of FFW.

did not find significant differences in male and female participation in FFW and FD; however, it found that households seem to invest proceeds from FD, which can be interpreted as an increase in unearned income, in girls' nutrition, while earnings from FFW are manifested in better nutrition in boys. The effects of the gender of the aid recipient were not conclusive.

3. Conceptual Framework

A simple utility-maximizing model can be used to analyze the allocation of time to different activities, including work and leisure. Suppose that the household utility function can be characterized as:

$$U = U(X_p, X_h, L), \quad (1)$$

where X_p refers to market-purchased goods, X_h refers to home-produced goods, such as child health and nutrition, and L is leisure. At this point we assume that the household has a single utility function, although we relax this assumption later. We first make the simplifying assumption that home produced goods depend only on household labor supply, t_h .⁶ That is,

$$X_h = f(t_h). \quad (2)$$

Suppose that the household derives income from agricultural production, from wage labor, from self-employment, and from participation in FFW activities. Suppose also that the household may be eligible to receive food aid through free distribution. Since free distribution does not require work, we can treat it like unearned income.⁷

The household income constraint can then be written as

⁶ This is similar to the exposition in Strauss and Thomas (1995) and Quisumbing (2003).

⁷ This abstracts from the time costs of obtaining food aid through free distribution.

$$p_a \cdot Q_a(A, t_a) + w(t_w + t_s + t_f) + N = pX_p, \quad (3)$$

where $p_a \cdot Q_a$ is the value of agricultural output, which is a function of land and other agricultural assets A and of time allocated to agricultural production t_a ; $w \cdot t_w$ is income from wage labor, where w is the market wage rate and t_w is time spent in the labor market; $w \cdot t_s$ is income from self-employment activities, where, for simplicity, we assume that the return to labor in self-employment is the same as that on the labor market, w . t_f is income from FFW, which, for purposes of exposition, involves a wage rate that is equal to the market wage. (In practice the wage rate may be lower for self-targeting purposes.) N is unearned income, which may include transfers such as those from FD. We do not analyze FD separately in this paper.⁸ Household income is spent on purchases of the market-produced good, X_p .

The time of individuals in the household is allocated to time in own agricultural production, time spent in the wage labor market, time on self-employment activities, time on FFW activities, time producing home goods, and leisure. Thus, the household time constraint is as follows:

$$T = t_a + t_w + t_s + t_f + t_h + L. \quad (4)$$

Incorporating the household time constraint into the income constraint, the full income constraint can be written as

$$pX_p + w \cdot L = w(T - t_w + t_s + t_f) + (p_a \cdot Q_a - w t_a) + (p_h X_h - w t_h) + N. \quad (5)$$

That is, total consumption, including the value of time spent in leisure, cannot exceed full income. Full income is the value of time available to all household members, returns from agricultural production, “profits” from home production, and nonlabor income N . Maximizing equation (1) subject to the full income constraint yields reduced

⁸ See Quisumbing (2003) for an analysis of the nutritional effects of FFW and FD.

form demand functions for goods \mathbf{x} and leisure L , which can be written as a function of prices, the vector of wages w , which includes both market wages and wages in FFW, and unearned income N , given the household's asset levels:

$$\mathbf{x} = \mathbf{x}(\mathbf{p}, \mathbf{w}, N; A); \quad (6)$$

$$L = l(\mathbf{p}, \mathbf{w}, N; A). \quad (7)$$

Suppose, however, that the household is composed of two individuals, m and f (for male and female, respectively), who do not have the same preferences, nor pool their incomes. A collective model of the household would then be more appropriate, and the demand functions would be⁹

$$x_i = x_i(\mathbf{p}, \mathbf{w}, N_m, N_f, A_m, A_f, \alpha_m, \alpha_f); \quad i = 0, m, f \quad (8)$$

and

$$L_i = L_i(\mathbf{p}, \mathbf{w}, N_m, N_f, A_m, A_f, \alpha_m, \alpha_f); \quad i = m, f, \quad (9)$$

where, in addition to wages and prices, the demand functions are conditioned on individual assets A_m and A_f and extrahousehold environmental parameters (EEPs) α_m and α_f . The EEPs affect the relative desirability of being outside the household (e.g., being single) and may include access to common property resources and divorce laws. Gender-specific targeting practiced in many FFW programs could also be viewed as an EEP that increases women's options outside marriage. Moreover, if spouses do not pool incomes, lump sum transfers such as free food distribution could have different effects depending on whether the husband or the wife was the recipient. For self-targeting purposes, wage rates in FFW programs should not be set higher than the prevailing market wage (Ravallion 1999; Subbarao 1997) although they may not necessarily improve women's

⁹ See Haddad et al. (1997) for a review. For a more detailed exposition and derivation of the reduced form demand functions, see Thomas (1990).

outside options if they are excessively low. However, as will be discussed later, opportunities for women to participate in the labor market are rare in rural Ethiopia.

Time allocation to various activities, including farm production, wage work, self-employment, home goods production, and FFW, could then be expressed as a function of the above right-hand side variables. In this paper, we investigate the determinants of participation in wage work, FFW, and self-employment, as well as the determinants of days worked and earnings in each activity. We then investigate the effect of program variables, particularly those that might affect women's propensity to participate in public works.

4. Data and Empirical Specification

4.1 Data

As mentioned above, this paper uses three sources of data, all based on the Ethiopian Rural Household survey (ERHS). We begin by providing an overview of the ERHS, then describe each of the data sources in detail. The first three rounds of the ERHS were conducted in 1994/95 by the Department of Economics of Addis Ababa University (AAU) and the Centre for the Study of African Economies (CSAE) of Oxford University, building on an earlier survey conducted in 1989 by the International Food Policy Research Institute (IFPRI). The 1997 round was undertaken by AAU in collaboration with IFPRI and CSAE. The ERHS covered approximately 1,500 households in 15 villages all across Ethiopia. While sample households within villages were randomly selected, the villages themselves were chosen to ensure that the major

farming systems are represented.¹⁰ While we do not employ any weighting procedure in pooling the observations, the sample is representative of the population of three out of four agroclimatic groups (excluding pastoralists). Thus, although the 15 villages included in the sample are not statistically representative of rural Ethiopia as a whole, they are quite diverse and include all major agroecological, ethnic, and religious groups.¹¹

The questionnaires for the first four rounds consist of a series of core modules on various issues such as consumption expenditures, wealth, income, and health, as well as a module on anthropometric measurements for all household members. The questionnaire used in the 1997 round includes the original core modules, supplemented with new modules specifically designed to address intrahousehold allocation issues. These modules were designed not only to be consistent with information gathered in the core modules, but also to complement individual-specific information.¹² These modules focused on conditions at marriage, particularly assets at marriage.¹³ The ERHS also has detailed self-reported information on different kinds of shocks, based on recall of events in the last cropping season and the relevant harvest. These are used to construct indices of adverse occurrences affecting crop and livestock production, which we describe in detail in the empirical specification. Typically, the respondent was the head of the household

¹⁰ About 400 households in six sites were initially surveyed by IFPRI in 1989; these were selected from drought-prone areas for the study by Webb, von Braun, and Yohannes (1992). Three more sites (one village in Wollo and two villages in Tigray) were added in 1994-1995 to include areas north of Debre Berhan, which could not be surveyed in 1989 due to military conflict. Six other sites were also added to cover the main agroclimatic zones and farming systems of the richer parts of the country. The selection of new sites is described in Kebede (1994).

¹¹ See Fafchamps and Quisumbing (2002) for a discussion of the representativeness of the sample.

¹² These are described in more detail in Fafchamps and Quisumbing (2002).

¹³ Because assets at marriage may determine spouses' bargaining power within marriage (Quisumbing and Maluccio 2003; Frankenberg and Thomas 2001), a variety of assets brought to the marriage were recorded, as well as all transfers made at the time of marriage. Values of assets at marriage were converted to 1997 birr using the consumer price index. See Fafchamps and Quisumbing (2002) for details.

although questions on bargaining power were administered separately to men and women.

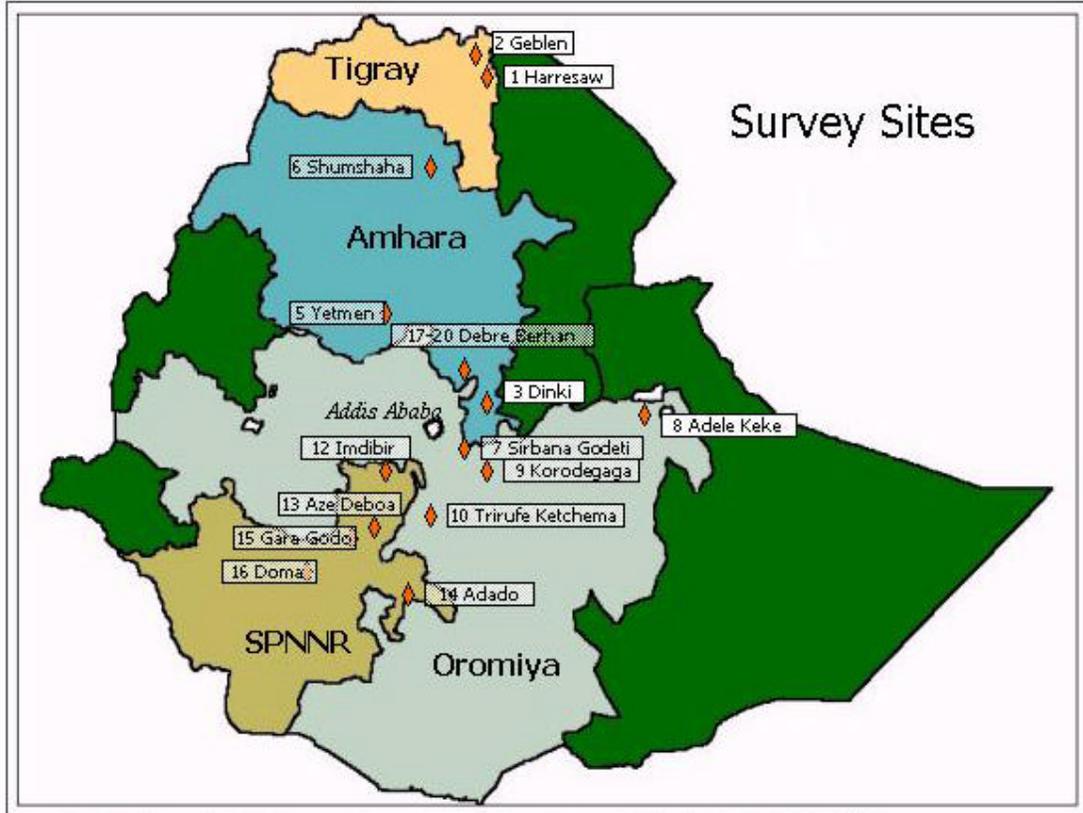
The geographical location of the surveyed villages is depicted in Figure 1. Most surveyed villages are placed along a North-South axis. This ensures a good coverage of the various agroclimatic zones that characterize the Ethiopian highlands where the bulk of the population lives. Arid lowlands and other regions that are particularly hard to reach, such as the western part of the country along the Sudanese border, were excluded from the sample for cost reasons. This may limit the policy conclusions on targeting that can be drawn.

Data from “off-farm and business activities” module

Each survey round obtained information on income earned from various activities in the past four months, including wage and salary work in a number of different occupations, FFW, and self-employment.¹⁴ Wage employment is dominated by agricultural labor in others’ farms, while self-employment activities include weaving, spinning, milling, trading, handicrafts, and transport. For each activity, information was collected on the number of days worked, whether the payment was in cash or in kind, the value of cash payments, the quantity and unit of in-kind payments, and the identity of the income recipient. Most participants in FFW received their payments in kind, typically in wheat, maize, sorghum, and cooking oil; all in-kind receipts were converted to cash

¹⁴ The off-farm and business activities module is administered to the household head, who answers for all relevant household members, identified by their ID codes from the household roster. A given household member can engage in more than one activity.

Figure 1—Ethiopian Rural Household Survey (ERHS) sites



Source: UNDP-EUE 1998.

Note: All borders and survey site locations are approximate.

equivalents using the village-level price in that specific period. We are unable to analyze agricultural labor, the most important activity, because information was collected only at the household level. The bulk of agricultural labor is performed by men, with the exception of so-called “women’s crops” such as *enset* (false banana), which is grown in the South. Women care for livestock and control the proceeds from dairying and other livestock by-products.

In this paper, we limit our analysis to villages that had food-for-work activities in a specific round (see Table 1) between Rounds 1-3.¹⁵ Thus, our analysis examines participation in off-farm labor markets—off-farm wage labor, FFW, and self-employment—conditional on a FFW program being in the village. We do not address issues of program placement in the paper, and because FFW programs do not operate continuously, villages included in the sample will differ from round to round. Because we want to compare other labor markets to FFW, our results should not be taken as representative of labor markets in Ethiopia, but of labor markets in villages where FFW is operating.

Table 1 presents descriptive information on participation in and earnings from wage labor, FFW, and self-employment by round, for males and females 15-65 years of age. Although participation rates are low in general, both wage labor and FFW are clearly dominated by men. Overall, 26 percent of men participate in off-farm labor markets, compared to 14 percent of women; individuals do participate in more than one off-farm income-earning activity. Participation in the wage labor market is 9 percent for men, and only 2 percent for women, and around 13 percent of men and 5 percent of women participate in FFW. In contrast, self-employment, although it has low overall participation rates, has the smallest gender gap in participation. About 7 percent of men and 8 percent of women on average are engaged in self-employment activities, and in each round, participation rates are higher for women.

¹⁵ We decided not to include Round 4 in this analysis because the timing of the Round 4 survey did not correspond to any of those in the previous three rounds, which were designed to cover an entire agricultural year. Moreover, the incidence of FFW seemed unusually low compared to the previous three rounds, probably owing to better economic conditions in 1997.

Conditional on participation, men and women work similar days in most activities. Men worked 41 days in wage labor over a four-month period, while women worked 43 days. In FFW, men worked 34 days, and women 30; in self-employment, conditional on working, men worked 46 days and women, 44 days. Among those who report earnings, however, men earn almost twice as much as women. In the wage labor market, men earn 2.7 times what women earn, and in self-employment, men earn 1.95 times women's self-employment earnings. The gender gap in earnings is smallest in FFW, where men have only a 4 percent advantage, on average, although there are variations across rounds, owing to the specific programs that were in place. Since, conditional on participation, women do not work significantly fewer days than men, returns to male labor must be substantially higher for them to have earnings differentials of this magnitude. The descriptive information also suggests that earnings are relatively more equal in FFW than in other labor market activities. Does this tentative conclusion hold, once other personal and household characteristics are controlled for? We investigate this further through using regression analysis.

Data from 1997 public works module

Aside from information on off-farm income-earning activities, the 1997 round included a module that obtained information on individual participation in public works programs, whether for food, cash, or as part of community labor arrangements. The recall period for this module was longer than the off-farm income-earning activities module—12 months (13 Ethiopian months), rather than four months. Owing to the longer recall period, this module would tend to capture a higher degree of participation in public works than the income-earning activities module. This module aimed to follow up

the earlier IFPRI studies on public works (von Braun, Teklu, and Webb 1991, 1992) based on the 1989 survey and the first round of the 1994 surveys (Seyoum et al. 1995). This module has questions regarding desire to participate in public works, reasons for not participating, reasons for not being hired if one applied, reasons for not working, as well as information on distance to public works, type of public works project, implementing agency, quantity and type of payment, and preferred type of payment. Unlike the earlier public works data, these questions were asked about all individuals above age 10, not just participants in public works, with the household head typically answering for the other household members. The new module thus focuses on *individual* participation and information on *individual* payments. However, most respondents did not know the agencies implementing the public works project, and tended to describe the project in generic terms (e.g., type of project), making it impossible to identify individual projects from the program data. While the information is not comparable to those in the previous rounds (1994/95), it provides a clearer picture of programmatic features of public works.

Program data from key informant interviews

Because the 1997 questionnaire did not obtain information on other program features that might be relevant to women's decision to participate, we commissioned a team of graduate students from Oxford University to collect additional information on the public works activities identified in the 1997 survey (Krishnan 2003). Using a checklist and a short questionnaire, the graduate students interviewed local leaders in 7 of the 15 survey villages in September-October 2003. Because respondents often did not know the specific agency that funded the public works activity, the team had to rely on more

intensive questioning of local leaders, who would be more likely to remember than the survey respondents.¹⁶

Some aspects of the fieldwork need to be borne in mind when using and interpreting these data. First, when the team was trying to collect program data on specific projects, they found that many projects were poorly identified as being “food-for-work WFP” or government (Krishnan 2003). Typically, WFP channels its operations through government agencies or NGOs and thus a project may not be identifiable as a WFP project (Robin Jackson, personal communication). Furthermore, the term “food-for-work” is also not a term used in policy work in Ethiopia. The typical distinction used by the government and indeed the WFP is between EGS (employment generation schemes) and free food aid, where employment generation schemes are expected to generate jobs as well as create public goods (Jayne et al. 2002), while free food aid (or free distribution) is given to individuals who cannot work. In any case, up to now there is not one single operational guideline on how programs should be structured, targeted, as distinguished from policy statements giving the intentions of providing carefully targeted programs. In fact, in practice, a multitude of rules exist that make it hard to describe “the” typical public works program run by the government, with or without support of the WFP. Finally, FFW is definitely not just a feature of programs implemented by the WFP with the government—other government and other organizations use the same principle.

Thus, the team decided to implement a short checklist of questions focusing on specific programmatic features (see Box 1).

¹⁶ In five villages, the principal informant was the chairman of the village or Peasant Association. In one village, the team interviewed a group of ten people, and in another, a group of eight.

Box 1. Checklist of questions for the key informant interviews, 2003

1. Location:
2. Date visited:
3. Primary interview respondent:
4. Title if applicable:

I. Project details for 1997 project

1. Implementing agency
2. Financing source
3. Details of projects (objectives, activities, etc...)
4. Type of work
5. Typical Number of employees

II. Participation

1. How long could you work for?
2. How was this allocated?
3. Was it perceived as fair?
4. Did women participate?
5. Mix men and women
6. Payment for project
7. Market wage at the time
8. Which type of payment preferred
9. Were any criteria used to select?
10. Was the programme targeted to the needy and poor?

III. Women's Participation

1. Were crechers present?
2. Were women targeted particularly?
3. Were women specifically informed?
4. Were women paid the same?
5. Did women dot he same jobs?

IV. Project Awareness

1. How were the people informed of projects?
2. Were any groups specifically targeted?

Other Notes

Source: Krishnan (2003).

To make the fieldwork feasible, they concentrated on the seven villages with the highest concentration of work episodes as reported in the 1997 public works module (Table 2).¹⁷ Ninety-eight percent of the program participation episodes took place in these villages, which are indicated in bold in the table. In three others, some programs took place, but in numbers that are extremely small, and often in unspecified programs. Using the checklist and open-ended interviews, the team generated an Excel database that was later coded by the authors to create variables for the descriptive and regression analysis.

There are some discrepancies between the impressions created in the community level and household-level data and the findings from the detailed conversations with key informants. In all villages, Peasant Association offices were first contacted, and most conversations were with the Peasant Association heads or their deputies. This will definitely have affected the answers to more sensitive or subjective questions, such as “was the program perceived fair,” or elements of the gender dimensions of the program. The reason is that the PA officials were almost always involved in the actual selection of household and individual participants in public works program. Also, communities differed substantially in terms of how the programs were actually functioning, for example in terms of targeting, the relationship between market wages and payments, etc. In at least one case, Koro Degaga, it felt that “textbook” or “rulebook” answers were given, while in others, the targeting was surprising (such as the strict rotation in Imdibir).

¹⁷ Note in Table 2 that the correspondence between work episodes and implementing organizations is not exact. In most villages where programs took place, different program organizations were identified, but it is not necessarily clear whether they were indeed multiple programs. For example, there is in principle no budget for Peasant Associations to organize programs themselves, but they are typically involved in one way or another for the allocation of jobs. Similarly, FFW is not necessarily a type or organization behind a program, but rather a way of implementing programs for different organizations.

Moreover, the time lag between the program interviews, which took place in 2003, and the actual implementation of the projects (which would have been in 1996, since the 1997 survey involved a one-year recall period) inevitably created recall bias. In fact, in many of the interviews, the memories of the interviewees or anyone else that could be reached were rather vague on some of the detail asked for, not least in areas where different programs had existed, clearly often with different implementing agencies, including from the government. The decentralization that started in 1996, with gradually more power devolved up to (at this moment) the *woredas*, also meant that details would have changed simply by changes of people in charge. Owing to the time lag between the interviews and the survey, as well as the fact that data collected was at the village level, we decided not to use the 2003 key informant data in regressions, but to use them as a source of information to characterize programs that were being implemented at the time of the survey.

4.2 Empirical specification

Participation in the labor market is influenced by individual, household, and community characteristics. Participation in “special” labor markets, such as those created through FFW, is also affected by targeting mechanisms. As mentioned earlier, FFW is targeted using administrative targeting, self-targeting, and community-based targeting. Thus, FFW receipts are not random and will depend on individual, household, and community characteristics.

Determinants of participation

We adopt a simple reduced form specification to analyze the participation decision and estimate a probit equation of the form:

$$y_{ij}^* = \Xi_0 + \Xi'_1 \mathbf{X}_i + \Xi'_2 \mathbf{X}_h + \Xi'_3 \mathbf{X}_v + \gamma_{ij}, \quad y_{ij} = 1 \text{ if } y_{ij}^* > 0, 0 \text{ otherwise,} \quad (10)$$

where y_{ij}^* , the labor force participation of the i th individual in the j th activity (wage labor, FFW, and self-employment), is modeled as a binary variable.¹⁸ It is a function of a vector of exogenous variables \mathbf{X}_i which includes individual characteristics such as sex, age, age squared, height (a measure of long-run nutritional status) and years of schooling, which are likely to influence the probability of participation; household variables \mathbf{X}_h such as household size (in natural logarithms), the household's age and sex composition, which would capture the need for child care or old-age support, as well as the availability of other working members; household wealth (land, and livestock), and household rainfall and livestock shocks, and community variables \mathbf{X}_v such as rainfall shocks. \mathbf{X}_h also contains "history" variables that capture the household's past experience with food aid, since bureaucratic inertia or past experience is an important determinant of food aid receipts (Jayne et al. 2002). \mathbf{X}_v could also contain characteristics of public works programs in the village; we explore this specification in Section 5. We include (but do not report) village and round dummies to proxy local labor market conditions. Means and standard deviations of dependent variables and regressors are presented in Table 3.

Individual characteristics. Sex, age, age squared, and years of schooling are the typical set of individual characteristics included in participation equations. We include height as an indicator of the individual's long-term nutritional status, which influences

¹⁸ We do not take into account the possibility that activity choice may be interdependent; however, this does not bias the estimation since we estimate reduced forms without any endogenous right-hand-side variables. We will explore the interdependence of activity choice in future work.

the individual's ability to do physical work, and which may affect selection into workfare versus free distribution programs. We use height rather than BMI because BMI (weight (in kilograms) divided by height (in meters) squared) is subject to short-term fluctuations. Weight-based measures may be affected by participation in strenuous activities and work effort in the short run, and thus would be endogenous.

Household demographic characteristics. These include the age and education of the household head, whether the household is female headed, the natural logarithm of household size, and the age-sex composition of the household. We pay special attention to whether labor force participation is influenced by the presence of infants and toddlers (age 0-3), preschoolers (age 3-7), and the elderly (age 65 and over), as well as other females of working age (working age males are the excluded category).

Assets. To proxy household wealth, we use land area and the value of livestock in Round 1. Land and livestock are less likely to be endogenous to Round 1 decisions, as they are relatively more difficult to accumulate than smaller assets such as consumer goods.¹⁹

Household shocks. The broad categories of shocks are rainfall shocks, non-rain shocks (mostly common problems related to pests, flooding insects, and animal trampling or weed damage), and livestock shocks.²⁰ We concentrate on two types of shocks: rainfall and livestock shocks. The individual rainfall index was constructed to measure the farm-specific experience related to rainfall in the preceding season, based on a series

¹⁹ We also used assets at marriage in a previous version of this paper. Assets at marriage are arguably the most exogenous measure to use, but these were collected on smaller sample of households than the asset and livestock data. Results using assets at marriage and land and livestock in round 1 are not qualitatively different.

²⁰ This description is taken mostly from Dercon and Krishnan (2000); for comparability, we followed a very similar methodology for creating the shock index.

of questions such as whether the rains came on time, whether there was enough rain on one's fields at the beginning of the rainy season, whether rains stopped on time, and whether it rained near harvest time. Responses to each of the questions (either yes or no) were coded as favorable or unfavorable rainfall outcomes, and averaged over the number of questions asked so that the best outcome would be equal to one and the worst, zero. Similar questions were also asked regarding livestock disease, scarcity of water, and scarcity of grazing land that might have adversely affected livestock holdings. Relatively speaking, livestock disease was quite important in the first round of data collection, particularly in the South.

Community shocks. The individual rainfall index was aggregated up to the village level using leave-out means. While a preferred alternative might have been to use village-specific rainfall data, rainfall data are collected in rainfall stations, not at the village level, and were not available for some villages.²¹

Past experience with food aid. We also include four variables capturing the “history” of food aid receipts: amounts of wheat (in kilograms) received during the 1983-84 famine, amounts of wheat received in the past three years prior to Round 1, whether the household received other kinds of food aid during the 1983-84 famine, and whether the household received other kinds of food aid in the last three years.

Because it is possible that the effects of these variables impact differently on individuals because of their sex, we also estimate a modified version of equation (10):

$$y_{ij}^* = \gamma_0 + \gamma_1 G_i + \gamma_2 \mathbf{X}_i + \gamma_3 G_i \mathbf{X}_i + \gamma_4 \mathbf{X}_h + \gamma_5 G_i \mathbf{X}_h + \gamma_6 \mathbf{X}_v + \gamma_7 G_i \mathbf{X}_v + \mu_{ij}, \quad y_{ij} = 1 \text{ if } y_{ij}^* > 0, 0 \text{ otherwise,} \quad (11)$$

²¹ We examined the correlation of community rainfall shocks with household rainfall and livestock shocks. The pair wise correlation coefficient of the community rainfall shock with household rainfall is 0.4903, while that with livestock shocks is 0.1408.

where G_i is a gender dummy (= 1 if the person is female), and $G_i \mathbf{X}_i$, $G_i \mathbf{X}_h$, and $G_i \mathbf{X}_v$ are interaction terms between gender and individual, household, and village characteristics. We test whether the interactions are jointly significant, which implies that individual, household, and village characteristics have a differential impact on men and women.

Determinants of days worked, wages per day, and earnings. We also have data on days worked and earnings for wage labor, FFW, and self-employment. To take into account the endogeneity of participation in labor market activities, we use the Heckman procedure to correct for selectivity (Heckman 1979). We assume that the determinants of days worked, wages, and earnings operate on two levels. First, the individual decides whether or not to participate in the specific labor market activity; second, conditional on participation, the individual decides on days worked, earnings, and imputed wages per day (computed by dividing total earnings by days worked). That is, we estimate

$$\mathbf{E}_{ij} = \mathbf{X}_i \beta + u_{1ij}, \quad (12)$$

where \mathbf{E}_{ij} is a vector of days worked, earnings, and imputed wages per day, by the i th individual in the j th activity, estimated separately for wage labor, food for work, and self-employment. \mathbf{E}_{ij} is observed only if

$$z_{ij} + u_{2ij} > 0, \quad (13)$$

where $u_1 \sim N(0, s)$, $u_2 \sim N(0, 1)$, and $\text{corr}(u_1, u_2) = ?$.

Equation (12) pertains to the determinants of individual days worked, earnings, and wages, while equation (13) is the (unobserved) selection process that is driven mostly by household characteristics. In equation (12), the vector \mathbf{X}_i contains individual characteristics such as the gender of the participant, years of schooling, experience, experience squared, height, and the interaction of these variables with the sex of the

individual, as defined above. Potential labor market experience is defined as age minus years of schooling minus 14. The selection equation follows the same specification as the participation probits in equation (11).

5. Results from the Off-Farm Income Module

Tables 4, 5, and 6 present marginal effects from probit regressions on the probability of participation in wage labor, FFW, and self-employment. All these regressions are based on individuals age 15-65, regardless of their labor market participation status. We present results for two specifications: one in which the gender dummy appears by itself, and another in which it is interacted with individual, household, and community characteristics.

In the specification without interactions, the gender dummy is negative and significant in the wage labor and FFW participation equations, but not in self-employment. In the specification with interactions, however, the gender dummy is more negative, but is no longer statistically significant. This is probably because, with fewer degrees of freedom, the coefficient on the gender dummy is imprecisely estimated. Nevertheless, as the joint tests on coefficients show, in the wage labor and FFW participation equations, all the interaction terms with gender and all gender terms are jointly significant. This indicates that there are significant differences in men's and women's participation, with the impact of gender occurring through its interaction with individual, household, and community characteristics.

Life-cycle effects (age and age squared) are strong in the wage labor equation (Table 4), and the wage labor market appears to attract taller individuals and better-

educated females. Household livestock holdings reduce participation in wage labor, probably owing to a wealth effect and the labor requirements involved in caring for livestock, especially for women. Indeed, livestock holdings have a negative effect on women's participation in wage labor relative to men. As expected, none of the variables capturing the history of food aid received affects participation in wage labor.

Life-cycle effects are also strong in the FFW equation (Table 5). Because able-bodied participants are chosen for FFW, the positive coefficient on height is expected. Schooling, however, has mixed effects on FFW participation. While individuals with more schooling are slightly less likely to participate in FFW—possibly due to an element of self-targeting—better-educated females are more likely to participate. The positive coefficients of the household head's schooling and of landownership suggest that FFW does not necessarily reach the poorest. Part of this may be due to impractical guidelines and the implementation (and adaptation) of these guidelines in the field.²²

FFW does perform a consumption-smoothing function. Since the rainfall and disease indices are constructed so that more favorable outcomes are closer to unity, a higher value of the index is a positive shock and thus the negative signs on the individual rainfall coefficient indicates that individuals are less likely to participate if households experience positive rainfall outcomes. Relative to males, females respond to positive rainfall shocks by increasing participation in FFW. If positive rainfall outcomes increase the demand for male agricultural labor on-farm, it is possible that only female labor

²² For example, one of the guidelines is “don't give priority to households owning any livestock asset—i.e., prefer those with zero livestock assets,” regardless of other considerations. This may lead to exclusion of families who would be considered poor using other criteria. A family of three with no livestock is enrolled into the program, whereas a family of six with one cow or one goat is excluded. So inequity in targeting outcomes could arise from the impractical guidelines issued by the central government (K. Subbarao, personal communication, March 5, 2003).

would be available to participate in FFW. Finally, whether the household received food aid in the last three years increases participation, suggesting inertia in food aid receipts.

With the exception of life cycle effects, very few individual or demographic characteristics affect participation in self-employment (Table 6). Individuals are less likely to engage in self-employment activities if community rainfall outcomes are positive, possibly owing to the increased demand for agricultural labor, although positive *household* rainfall shocks weakly increase participation in self-employment. Household and individual rainfall shocks also have different effects on women, with positive community shocks increasing women's participation, and positive household outcomes reducing it. Positive community rainfall shocks may increase the demand for women's products (such as crafts, beer, dairy products), while positive household rainfall outcomes could exert a negative effect on women's participation via an income effect.

As mentioned earlier, gender-related interactions and all gender terms are jointly significant in the wage labor and FFW equations, but not in the self-employment equation. Interactions with individual characteristics are significant in wage labor and FFW, but not in self-employment. Assets have gender-differentiated impacts only in the wage labor equation, while only the self-employment equation shows that men and women respond differently to household and community shocks.

What may be surprising at first glance is the insignificance of the gender interaction with household demographic characteristics. Studies examining female labor supply have pointed to the negative effect that young children have on women's labor force participation in settings as diverse as Guatemala City (Hallman et al. 2003) and rural Bangladesh (del Ninno, Wheatley, and Liu 2004), although this effect may be

diminished by the provision of child care facilities in public works sites.²³ Young children do not appear to have a pronounced negative effect on labor force participation in Sub-Saharan Africa, particularly in the agricultural and informal sectors, owing to work patterns in which mothers take babies to work, often on their backs, and the proximity of the extended family, a source of substitute caregivers.²⁴ Indeed, an evaluation of a large FFW project in Ethiopia found that childcare was not considered a problem, since half the respondents left their young children in the charge of older children and grandparents, while the remainder did not have children who could not take care of themselves (Yeraswork and Solomon 1985, 56).

Table 7 presents Heckman two-step estimates of the determinants of days worked, wages per day, and earnings from wage labor. Controlling for selection into wage labor, females and better educated individuals spend more days in wage labor, but these effects are only weakly significant. Relative to males, taller females spend fewer days in wage labor. In contrast, experience and its square are significant in the wage equation, and wages are higher for taller individuals. Finally, in the earnings equation, better-educated and taller individuals earn more from wage labor. Table 8 presents similar results for FFW. Controlling for selectivity of participation, persons with more experience spend fewer days in FFW, while taller persons work more days. While none of the regressors in the wage equation are significant, earnings are higher for better-educated persons.

²³ An interesting finding of the Deolalikar and Gaiha (1996) study is that the number of children in the household did not have any effect on female participation, possibly because the Maharashtra EGS provided on-site crèches. In contrast, the Trabajar scheme in Argentina did not provide crèches, possibly leading to a lower rate of female participation (Jalan and Ravallion 1999).

²⁴ For evidence showing that young children do not affect women's labor force participation in Accra, Ghana, see Quisumbing, Hallman, and Ruel (2003).

Finally, Table 9 shows Heckman two-step estimates for self-employment. Controlling for selection, females with more years of schooling spend fewer days on self-employment activities. Females, particularly those with more experience, earn higher wages per day from self-employment. While taller individuals earn more per day from self-employment, this advantage tends to favor males relative to females. Finally, after controlling for selection, the only consistent determinant of earnings is height, possibly a proxy for unobserved characteristics that are correlated with better long-term nutritional status.

Once participation is controlled for, there are very few gender-related determinants of days worked, wages, and earnings in both wage labor and FFW. Thus, gender differences in the wage labor market and FFW arise primarily from differences in participation. However, gender differences play a greater role in self-employment.

6. Results from the 1997 Public Works Module and 2003 Program Data

While the above results shed light on differential participation by sex in different types of labor markets, they are not particularly informative about the features of public works programs that may enhance women's participation. To investigate this further, we analyze the public works module in the 1997 survey. While this module cannot be linked to earlier rounds, it is more detailed in terms of project information.

Table 10 presents the characteristics of public works programs in the seven villages for which we have program information. The top panel summarizes information from the public works module in the 1997 round, while the bottom panel presents information from the key informant interviews conducted in 2003. Owing to the

difficulty of identifying individual projects from the survey data, we present descriptive statistics at the village level.²⁵

The most common types of public works projects in 1997 were infrastructure and soil conservation projects, which were present in 71 percent of the villages. Social services construction projects (building and maintenance of schools and clinics) were found in 57 percent of the villages, while 43 percent of the villages had water supply/irrigation projects and forestry projects. Participants had to travel an average of 3.25 kilometers to the work site.

Again, because it was difficult to identify individual projects, the information presented in the second panel of Table 10 is at the village, not the project, level. According to the 2003 interviews, women accounted for about 26 percent of employment in public works projects, ranging from 10 to 60 percent of project participants. Women were specifically targeted in 43 percent of the seven villages, but this does not mean that women were prioritized in job allocations (only 14 percent of the villages reported that women were a priority) and only 14 percent of the villages reported any information campaign directed specifically to women. Crèches were found only in one village, since in others, neighbors took care of the children when the mother had to work. While program officials in all villages said that men and women were paid the same for the same type of job, women tended to be given lighter work than men.

Although there was a wide variation in employment duration (from 12.5 days to “indefinite”), jobs were rationed in 43 percent of the villages. This process was deemed to be fair in a majority of cases (86 percent), although in one project, it was claimed that

²⁵ That is, we can say that infrastructure projects were present in 71 percent of the villages, but we cannot discern the actual number of infrastructure projects.

the project officials favored their friends and relatives. In 70 percent of the villages, program officials said that jobs were allocated to those with fewer assets (usually land and cattle).

Finally, it is interesting to note that the imputed average wage per day (computed by taking the average of the value of earnings in kind and in cash, divided by workdays) from the survey is higher (5.08 birr) compared to the average wage per day in public works (3.44 birr) from the village interviews. The market wage—in the few villages where a labor market existed in 1996/97—was 4.13 birr. Indeed, the 2003 interviews suggest that in 25 percent of the villages, public works projects paid higher than the market wage. This confirms the earlier findings of Sharp (1997). In the vast majority of villages (71 percent), wages were paid in kind.²⁶

Table 11 presents a descriptive picture of participation and earnings from public works, by type of project, of individuals age 15-65. Similar to the descriptive results from the 1994-95 data, men participate more than women in public works—23 percent compared to 12 percent.²⁷ Conditional on participation, however, women work more days in public works, at 47 days compared to 30 days, and, with roughly equal wages, earn more than men, at 194 birr compared to 155 birr for men. However, there are substantial differences across types of projects.

²⁶ It would have been interesting to test whether women preferred wages in kind. It has been argued that in setting where women are responsible for food provision, and if intrahousehold resource competition exists, food could be a more effective mechanism for transferring resources to children, as in some Islamic communities in the Greater Horn of Africa (Barrett, Holden, and Clay 2001). However, there was too little variation in the form of wage payments—these were paid in kind in 71 percent of the villages—to obtain significant coefficients on this variable.

²⁷ Possibly due to the longer recall period (12 months versus four months) and more detailed probing of participation in public works, reported participation rates are higher than those obtained from the income-earning activities module.

We take a closer look at the three types of projects that account for the greatest number of work episodes, infrastructure, soil conservation, and forestry. While more individuals participated in infrastructure projects compared to other types of projects, forestry projects generated the most workdays for participants—men worked 52 days in forestry projects, and women, 73 days.²⁸ Wage rates in forestry projects, however, were lower than those in infrastructure and soil conservation. Indeed the minor differences between total earnings in these three types of projects suggest that some projects may have operated on fewer days, but higher wages, while others (such as forestry projects) would have hired individuals for a longer period of time, but with lower wages per day. Forestry projects, in particular, often involve a yearlong contract in which individuals are asked to plant and care for tree seedlings. There are relatively few participants in water supply and social services projects and those classified in the “other” category.

Most of the variation in men’s and women’s participation seems to arise from the types of projects in place. Infrastructure employed the largest number of men, but relatively fewer women. Soil conservation projects and forestry projects, on the other hand, seem to be relatively “gender fair” in terms of the number of men and women employed. The bias towards males in infrastructure projects and the relative “fairness” of soil conservation and forestry projects may be attributable to the types of activities undertaken in the projects themselves, as well as individuals’ decision to participate in those projects. Infrastructure projects typically include more strenuous activities such as carrying stones and digging ditches, whereas forestry projects involve “lighter” work such as watering plants and weeding. Cultural norms may also affect men’s and

²⁸ The large number of days worked by females in water supply, social services, and other projects is probably due to an outlier and should be discounted due to the small cell size.

women's decision to participate in a project. For example, a previous evaluation found that in one catchment area, for example, women did not even participate in a project since, in the local culture, the activities done were thought to be "the work of men" (Yeraswork and Solomon 1985, 54).

Soil conservation and forestry projects also operate for longer periods, on average, which may allow participants greater flexibility in accomplishing tasks, say through piece-rate arrangements. Such flexible arrangements may be more conducive to female participation because of the demands housework puts on their time (Coady 2004). Evidence from the key informant interviews suggests that women and men are not assigned the same tasks. Women may also change the terms of wage payment to suit their abilities or to accommodate other responsibilities.²⁹

Table 12 presents the marginal effects from probit regressions of the determinants of participation in public works, estimated using the public works module in the 1997 round. These regressions differ from the earlier participation regressions owing to the longer recall period and the inclusion of program variables.³⁰ Similar to the participation equations in Table 4, 5, and 6, we present two specifications: one where the gender dummy appears alone, and the other where gender is interacted with individual, household, and community characteristics. Similar to the earlier results for FFW, we find

²⁹ In a public works project in Zambia, for example, women bargained with scheme operators and settled for a task-based wage rather than a daily wage. Thus the wage (rate) for a job of lifting bricks from one location to another is fixed through negotiation. Women can then come and do the job when their children are sleeping, allowing them to optimize their time allocation between public works and domestic production (K. Subbarao, personal communication, March 5, 2004).

³⁰ Although we have additional program variables from the key informant interviews, we use those derived from the 1997 public works module owing to the strong probability of recall bias in using the 2003 data. Moreover, program variables that are viewed to increase an individual women's participation—such as the presence of a crèche or the percentage of women employed in a project—are arguably endogenous to the outcomes we are modeling here. For example, a project with many female participants would be more likely to have a crèche, possibly because participants demanded it—and causality would be difficult to establish.

strong life-cycle effects, and also find that better-educated individuals are less likely to work in public works, probably through a self-targeting mechanism. Individuals are less likely to participate in public works if community rainfall outcomes are favorable, although they participate more if household rainfall outcomes are positive. The magnitude of the response to household rainfall shock is quite small, however—only about a third of the response to the community rainfall shock. Favorable livestock outcomes surprisingly increase women’s likelihood of participation in public works, although this result is only weakly significant.

Unlike the earlier results for FFW, gender interactions with household demographic characteristics are jointly significant, though only at the 10 percent level. Possibly because we are looking at decisions taken over an entire year, trade-offs between public works and domestic work become more important. To investigate which demographic category has the greatest impact on women’s participation, we test for the joint significance of the demographic category and its interaction with the female dummy. We reject the null hypothesis that these are jointly insignificant for preschoolers ($\chi^2 = 6.37$; $p = 0.0413$) and children 7-15 ($\chi^2 = 9.49$; $p = 0.0087$). Evidence from the field suggests that preschoolers may pose more of a constraint to women’s participation in FFW than infants and toddlers (K. Subbarao, personal communication, March 5, 2004). However, the influence of children 7-15 may be acting through a different pathway. Since children in this age range could also be undertaking part-time work, childcare responsibilities do not seem to be the reason that school-age children make female participation in public works less likely. It is possible that children 7-15

substitute for females in off-farm-work, reducing the probability that an individual female would need to participate in public works.

Relative to infrastructure projects (the excluded category), the presence of water, social services, and other programs dampen the likelihood of participation, consistent with the low participation rates reported in Table 11. With the exception of the distance interaction, individual interactions of program variables with the female dummy are insignificant, but gender interactions with program variables are jointly significant. We examine this further in the days worked, wages, and earnings and regressions (Table 13).

Table 13 presents Heckman two-step estimates of days worked, wages per day, and earnings from public works in 1997. Schooling does not affect days worked in public works, but females with more labor market experience spend fewer days in public works relative to males with more experience. The most interesting result from this table, however, is the significance of the program variables and the significance of their joint interactions with gender. The participation results showed that the presence of water, social services, and other projects in the village reduced the probability of participation. Conditional on participation, however, days worked in water, social services, and other projects are slightly higher, but wages are lower, leading to an insignificant net effect on earnings. The presence of forestry projects, which have longer durations of employment, reduces wages and thus does not significantly affect earnings. The presence of soil conservation projects increases wages, but does not significantly increase earnings owing to the negative (though statistically insignificant) effect on days worked. It is possible that project managers may choose to optimize project budgets by either maximizing employment at lower wages, or offering fewer positions, but at higher wages.

Government projects, however, both offer more days worked and higher wages, thus having significant positive effects on earnings. Distance to the site also reduces both the number of days worked and earnings. Thus, similar to the results using the 1994-95 data, gender differences are strongest in the participation equation.

To better understand the employment process in public works—from application to actual work—we turn to the participants’ and nonparticipants’ own views (Table 14). Our first observation is that very few individuals apply for a job—23 percent of men, and 14 percent of women. The three main reasons for men’s not applying are the need to work on the farm (33 percent), the fact (or perception thereof) that no jobs were being offered (14.4 percent) and the perception that there was no chance of being hired (12.5 percent). For women, the biggest hurdles to application were conflicts with childcare and other responsibilities (26.7 percent), being too young or too old (16.5 percent), and no jobs being offered (14 percent).³¹ Non-application appears to be the biggest barrier to participation, since 80 percent of men and 75 percent of women who applied were eventually hired. For both men and women, a scarcity of jobs was the main reason for rejection, accounting for 60 percent of male and 64 percent of female responses. Being “richer” only accounted for 5 to 6 percent of rejections, which may indicate the non-application of means-based targeting criteria. However, most of the individuals eventually found work in another program.

³¹ Low participation rates can also be explained by the manner in which public works projects are implemented. Almost the entire activity is funded using donated food, which arrives at the Djibouti port (at a landed cost of \$152 per ton). It then takes months to reach locations even as close as 100 miles -- and the unit cost per ton goes up to \$350 per ton, owing to the poor transport network and the high costs of transporting grain. Thus, grain arrives for public works at a time when even very poor farmers are busy on their own farms. The program fails because it does not operate at a time when the opportunity cost of labor is lowest – rather, the scheme is floated when the opportunity cost of labor is highest, so the takers for the program are so few. As a result the program also fails to perform its consumption smoothing function (Smith and Subbarao 2003; K.Subbarao, personal communication, March 5, 2003).

Among those women who did not find work in another program, illness was the major reason for not finding work (33 percent), followed by the perception that there was no chance of being hired (26.7 percent). For men, the perception that they had no chance of being hired was the major reason accounted for 28.6 percent, and illness, 21.4 percent. The prevalence of illness as a reason for not finding work is cause for concern, given the high burden of disease and the low levels of public health spending in this low-income economy.³² Finally, 91 percent of those who did not find work would have wanted to work more. Most (80 percent for men, 60 percent for women) were unable to because the project ended. Clearly, lack of job openings, the need to ration jobs, and perceptions of the low probability of being hired affect both men and women. Childcare responsibilities—for the preschool age group—affect women more than men, and thus may be an important consideration in determining women’s sustained participation in public works programs. Given the increasing evidence that preschool programs can improve future schooling outcomes (see the volume edited by Young 2002), combining early childhood development programs (social and cognitive stimulation, nutrition services) with child care for working mothers may relieve constraints for women’s participation in public works as well as lay the foundation for entry into primary school.

7. Conclusions and Policy Implications

Our preliminary results suggest that FFW in Ethiopia operates in a similar fashion to other labor markets, in which female participation is low. In regressions using data

³² The highest level of per capita health spending ever recorded in Ethiopia as of 1997, when the survey took place, was US\$4. Preventive care received only 16 percent of total health expenditure. At a level of \$4, this translates to no more than US\$0.50 spent on a package of basic health services including immunization, protected water supply, sanitation, and food supplementation, from government, donor, and NGO sources (Subbarao and Mehra 1997).

from 1994-95, and those using the 1997 data, gender differences are most evident in the decision to participate. However, the results from the 1994-95 data show that different factors resulting in differential female participation may be operating in different types of labor markets. In the wage labor market, interactions of gender with individual characteristics such as schooling, and with household asset positions (especially livestock) are important. Better educated women are more likely to participate in the wage labor market, while higher livestock holdings diminish participation more for women, owing to women's important role in dairy production. Females with more schooling are also more likely to participate in FFW. However, men and women's participation in FFW and self-employment does not respond in the same way to household and community shocks.

Controlling for selection, however, it is difficult to ascertain the presence of a gender disadvantage in the wage labor market and FFW, since most of the gender interactions are jointly insignificant. Only in self-employment do women earn higher wages per day, although there is no significant positive effect of being female on earnings. The most consistent results from both the 1994-95 data are the positive earnings effects of schooling and height in both in wage labor and FFW, conditional on participation. This suggests that even in the low-skill labor markets of rural Ethiopia, there are returns to investments in human capital.

We obtain additional information from regressions with program variables using the 1997 data. These variables are highly significant determinants of participation, and affect men and women's participation in different ways. The descriptive results show that the type of project is to a large part responsible for the variation in participation, days

worked, wages, and earnings. These differences arise from the type of activities inherent in these projects as well as project managers' discretion to optimize days worked or wages per day, given a fixed budget. The regression results show that relative to infrastructure projects, water, social services, and other projects decrease participation probabilities. Government projects increase participation probabilities, wages, days worked, and earnings, conditional on participation. Distance has a strong negative effect on women's participation relative to males.

Is workfare thus gender fair? The pattern of earnings differentials in FFW and public works programs does not seem to be very different from those in the labor market, where most of the differential is attributable to differences in returns. FFW in Ethiopia does not appear to be more "fair" than the wage labor market in general, despite directives to target women or to ensure women's control of the food entitlement in FFW operations. It is perhaps unrealistic to expect that public works will have a different work culture than the wage labor market in general, except perhaps for rare cases where affirmative action is actively pursued.

Given the low levels of women's participation in public works in Ethiopia, the binding constraint of the limited number of jobs, and cultural norms that may affect sorting into activities—is public works the most effective way of reaching women? WFP has already begun to rethink the importance of FFW as a way of enhancing women's involvement (WFP 2003b). If women are excluded from decisions regarding the creation and management of assets, their share of the benefits may be lower than men's. While increasing women's involvement in decisionmaking is more difficult to monitor than counting the number of male and female workers, the latter may be better able to ensure

that they will benefit from the assets created. Increasing participation may also improve project performance, as an evaluation of 101 public works programs in South Africa suggests. Even after accounting for the endogeneity of participation, *de facto* participation led to project outcomes that were more cost-efficient, generated increased direct benefits to the community, and with greater gender impact (Adato, Hoddinott, and Haddad 2003).

At the same time, guaranteeing wage equality with men may not satisfy women's other objectives. Female workers may be more likely to share earned rations with family members, especially their children, and, combined with more strenuous activities, this practice may lead to a deterioration of the female worker's own nutritional status (Barrett, Holden, and Clay 2001). Thus, FFW activities should also take into account women's physical capacities, the need to maintain their own nutritional status, and be designed in a way that facilitates their work participation. Flexible scheduling and provision of crèches will often be required to allow women who perform many tasks within the household to participate, especially for widows and single mothers, and mothers of young children (WFP 2003b). Providing crèches-cum-ECD programs may help relieve childcare constraints for mothers who participate in public works, while taking advantage of a window of opportunity to invest in the next generation (Hoddinott and Quisumbing 2003).

A more radical departure from traditional food assistance is the new emphasis on food for training (FFT). FFT programs aim to build human assets, and provide incentives for women to participate in training programs on income-generating skills, nutrition and health education, and life skills training (functional literacy and numeracy, leadership

skills and political and social awareness). Indeed, our analysis of participation and earnings show consistently high returns to human capital, whether to long-term nutritional status (height) or schooling. FFT programs that increase women's stock of human capital may yield higher returns for women in the long run than the unskilled work typical of FFW.

Table 1. Participation and earnings in wage labor, food-for-work, and self-employment in the past 4 months, by sex
All monetary variables in 1997 birr
Individuals 15-65, villages with food-for-work projects in that specific round

	Survey round						All rounds	
	1994a		1994b		1995		Males	Females
	Males	Females	Males	Females	Males	Females		
Number of observations	409	415	454	472	605	614	1923	1965
<i>Participation rates</i>								
Wage labor	0.11	0.02	0.11	0.02	0.08	0.01	0.09	0.02
Food-for-work	0.18	0.07	0.16	0.06	0.14	0.07	0.13	0.05
Self-employment	0.08	0.12	0.09	0.10	0.06	0.09	0.07	0.08
All off-farm labor	0.35	0.21	0.32	0.16	0.26	0.16	0.26	0.14
<i>Days worked in each activity, for participants only</i>								
Wage labor	36.26	28.44	44.90	48.75	34.53	44.63	40.89	43.10
Food-for-work	37.16	35.80	48.73	36.04	51.00	52.00	33.94	29.75
Self-employment	59.19	37.77	46.00	43.35	39.82	49.85	46.38	43.67
Total days worked off farm	44.44	36.55	52.35	44.28	30.14	39.18	42.75	40.30
<i>Imputed wages per day, for those reporting wages only</i>								
Wage labor	4.21	2.45	5.84	1.14	7.22	2.39	6.36	2.45
Food-for-work	3.05	3.27	2.81	3.89	3.97	3.23	3.30	3.32
Self-employment	6.55	2.15	11.21	2.02	17.24	3.39	12.55	2.65
Wages in off-farm-work, all activities	4.00	2.58	6.05	2.53	7.45	3.11	6.27	2.82
<i>Earnings, for those reporting positive earnings</i>								
Wage labor	127.85	53.14	329.92	108.70	261.40	86.29	275.27	101.89
Food-for-work	121.40	122.26	98.93	106.77	76.01	65.22	98.40	94.30
Self-employment	292.10	90.16	179.79	71.01	255.57	176.97	274.76	117.07
All off-farm-work	174.03	97.88	205.44	89.02	191.61	138.21	218.55	111.95
Number of villages with public works, by round	5		7		8			
Number of villages with valid data (a)	5		5		7			

Source: Rounds 1-3, Ethiopian Rural Household Survey, off-farm income and business activities module

Note: Numbers reported in all rounds are averages taken over all individuals in all rounds, not weighted averages of the round-specific means.

(a) The incidence of public works in two villages, Dinki and Shumshaha, was very low, possibly reflecting data quality. We do not include these villages in the descriptive tables or regressions.

Table 2. Distribution of public works programs and work episodes by village, 1997

Village	Type of program	Allocated work episodes	Total work episodes by village
Haresaw	REST	32	70
	World Vision	31	
	FFW	7	
Geblen	Irish School 'DonBosco'	21	25
	FAO/Mi n Agr/PA	4	
Dinki	Government	20	20
Yetemen	none	0	0
Shumshaha	Government	5	5
Sirbana Godeti	none	0	0
Adele Keke	Government	1	1
Korodega	Government	131	137
	FFW	6	
Tirufe Kechemema	none	0	0
Imdibir	FFW	42	42
Aze Deboa	none	0	0
Adado	none	0	0
Gara Godo	Govt/NGO/PA	10	43
	FFW	28	
	NGO	5	
Domaa	1. Govt/PA	11	12
	2. FFW	1	
Debre Berhan	Peasant Association	2	2
Total		357	357

Source: Krishnan 2003.

Note: Entries in bold indicate villages for which program information was collected.

Table 3. Means and standard deviations of variables used in regressions

Variable	Mean	Standard deviation
<i>Percent participating in:</i>		
Wage labor	0.05	0.23
Food for work	0.09	0.28
Self-employment	0.07	0.26
All off-farm-work	0.20	0.40
<i>Days spent in</i>		
Wage labor	2.22	12.72
Food for work	2.89	11.46
Self-employment	3.28	14.78
All off-farm-work	8.39	22.11
<i>Imputed wages in</i>		
Wage labor	5.73	8.18
Food for work	3.31	3.08
Self-employment	7.29	23.03
Off-farm-work	5.05	13.97
<i>Earnings from</i>		
Wage labor	12.83	110.09
Food for work	8.07	38.96
Self-employment	14.33	116.03
Off-farm-work	35.23	165.97
<i>Individual characteristics</i>		
Sex (1 if female)	0.51	0.50
Age in years	32.86	13.51
Experience	17.36	13.69
Highest grade attained	1.71	1.38
Height in cm	159.92	10.05
<i>Household characteristics</i>		
Age of household head	45.27	11.31
Education of household head	1.68	1.55
Whether household is female-headed	0.06	0.23
Log of household size	1.99	0.47
<i>Proportion in demographic categories (males 15-65 is excluded category)</i>		
Children 0-3	0.08	0.10
Children 3-7	0.11	0.11
Children 7-15	0.20	0.15
Females 15-65	0.29	0.14
Over 65	0.03	0.07
<i>Assets</i>		
Land in Round 1 (hectares)	0.79	0.72
Value of livestock in Round 1 (1997 birr)	1,297.12	1481.97
<i>Community shocks</i>		
Community rainfall index (1 is best, leave-out mean)	0.67	0.20
<i>Household shocks (1 is best)</i>		
Rainfall index	0.67	0.34
Livestock index	0.83	0.24
<i>History of aid received</i>		
Kilograms of wheat received in 1983-84 famine	23.83	65.91
Kilograms of wheat received in 1991-93	120.47	366.21
Whether received other aid in 1983-84 famine	0.37	0.48
Whether received other aid in 1991-93	0.48	0.50

Source: Rounds 1-3, Ethiopian Rural Household Survey.

Table 4. Determinants of participation in wage labor, with and without gender interactions, individuals 15-65

Villages with public works in specific round, Rounds 1-3

Probit estimates with robust standard errors, marginal effects reported

	Without interactions		With interactions	
	dF/dX	z	dF/dX	z
<i>Individual characteristics</i>				
Sex (1 = female)	-0.051	-5.10	-0.082	-0.53
Age in years	0.004	2.46	0.003	2.07
Age in years squared	0.000	-2.17	0.000	-1.86
Highest grade attained	0.003	0.89	-0.001	-0.43
Height	0.001	1.85	0.001	1.73
<i>Sex x individual characteristics</i>				
Age x female			0.000	0.06
Age2 x female			0.000	0.04
Education x female			0.011	2.81
Height x female			0.000	-0.11
<i>Household characteristics</i>				
Age of household head	0.000	-0.37	0.000	-0.38
Education of household head	-0.006	-1.44	-0.002	-1.04
Female-headed households	-0.013	-1.02	-0.009	-0.94
<i>Household demographics</i>				
Ln of household size	-0.008	-0.67	-0.010	-1.09
Children 0-3 (ratio)	-0.023	-0.54	-0.014	-0.42
Children 3-7 (ratio)	0.055	1.48	0.034	1.10
Children 7-15 (ratio)	0.048	1.44	0.027	0.97
Females 15-65 (ratio)	0.003	0.08	-0.002	-0.06
Over 65 (ratio)	0.111	1.86	0.057	1.16
<i>Sex x household demographics</i>				
Ln household size x female			0.021	1.55
Children 0-3 x female			-0.060	-0.78
Children 3-7 x female			0.048	0.87
Children 7-15 x female			0.026	0.65
Females 15-65 x female			0.010	0.19
Over 65 x female			0.133	1.27
<i>Assets</i>				
Land in hectares (Round 1)	0.005	0.85	0.005	1.09
Value of livestock in Round 1 (1997 birr)	0.000	-2.29	0.000	-1.75
<i>Sex x assets</i>				
Land in Round 1 x female			-0.007	-0.95
Livestock in Round 1 x female			0.000	-2.17
<i>Community shocks</i>				
Community rainfall index (1 is best, leave-out mean)	0.056	0.92	0.035	0.78
<i>Household shocks (1 is best)</i>				
Rainfall index	0.008	0.68	0.009	0.93
Livestock index	-0.013	-1.19	-0.007	-0.76
<i>Sex x community shocks</i>				
Community rainfall index x female			-0.005	-0.12
<i>Sex x household shocks</i>				
Rainfall index x female			-0.008	-0.36
Livestock index x female			-0.022	-1.04
<i>History of shocks and aid received</i>				
Kilograms of wheat received in 1983-84 famine	0.000	1.53	0.000	1.60
Kilograms of wheat received in 1991-93	0.000	0.24	0.000	0.24
Whether received other aid in 1983-84 famine	0.015	1.08	0.013	1.19
Whether received other aid in 1991-93	-0.009	-0.72	-0.008	-0.91
<i>F-test on interaction terms (p-values)</i>				
Sex x individual characteristics=0			8.38	0.08
Sex x household demographics=0			7.31	0.29
Sex x assets=0			8.54	0.01
Sex x community shocks=0			0.01	0.91
Sex x household shocks=0			1.50	0.47
All interactions=0			39.64	0.00
All gender terms=0			61.83	0.00
Observed probability	0.06		0.06	
Predicted probability	0.02		0.02	
Number of observations	1,837		1,837	
Wald test (Chi-square)	185.71		258.61	
Prob > chi2	0.00		0.00	
Pseudo R2	0.2359		0.26	

Notes: Regressions included round and village dummies, which are not reported here. z -statistics in bold are significant at 10 percent or better.

Table 5. Determinants of participation in food for work, with and without gender interactions, individuals 15-65

Villages with public works in specific round, Rounds 1-3

Probit estimates with robust standard errors, marginal effects reported

	Without interactions		With interactions	
	dF/dX	z	dF/dX	z
<i>Individual characteristics</i>				
Sex (1 = female)	-0.092	-5.66	-0.195	-0.72
Age in years	0.006	2.04	0.010	2.66
Age in years squared	0.000	-2.01	0.000	-2.51
Highest grade attained	-0.005	-0.82	-0.009	-1.65
Height	0.003	3.30	0.002	2.23
<i>Sex x individual characteristics</i>				
Age x female			-0.001	-0.21
Age2 x female			0.000	-0.03
Education x female			0.018	2.44
Height x female			0.001	0.49
<i>Household characteristics</i>				
Age of household head	0.000	0.19	0.000	0.29
Education of household head	0.005	1.17	0.008	1.81
Female-headed households	0.058	1.88	0.049	1.66
<i>Household demographics</i>				
Ln of household size	-0.029	-1.52	-0.012	-0.56
Children 0-3 (ratio)	0.034	0.46	0.009	0.11
Children 3-7 (ratio)	0.091	1.44	0.033	0.44
Children 7-15 (ratio)	0.047	0.78	0.016	0.25
Females 15-65 (ratio)	0.060	0.98	0.005	0.07
Over 65 (ratio)	-0.010	-0.08	-0.085	-0.61
<i>Sex x household demographics</i>				
Ln household size x female			-0.015	-0.53
Children 0-3 x female			-0.047	-0.38
Children 3-7 x female			0.055	0.49
Children 7-15 x female			-0.016	-0.15
Females 15-65 x female			0.056	0.50
Over 65 x female			0.160	0.60
<i>Assets</i>				
Land in hectares (Round 1)	0.014	1.35	0.023	1.95
Value of livestock in Round 1 (1997 birr)	0.000	-1.57	0.000	-1.38
<i>Sex x assets</i>				
Land in Round 1 x female			-0.024	-1.57
Livestock in Round 1 x female			0.000	-0.50
<i>Community shocks</i>				
Community rainfall index (1 is best, leave-out mean)	-0.022	-0.25	-0.024	-0.27
<i>Household shocks (1 is best)</i>				
Rainfall index	-0.036	-1.93	-0.055	-2.27
Livestock index	-0.028	-1.05	-0.026	-0.88
<i>Sex x community shocks</i>				
Community rainfall index x female			0.015	0.19
<i>Sex x household shocks</i>				
Rainfall index x female			0.070	1.86
Livestock index x female			-0.014	-0.29
<i>History of shocks and aid received</i>				
Kilograms of wheat received in 1983-84 famine	0.000	-0.80	0.000	-0.77
Kilograms of wheat received in 1991-93	0.000	0.84	0.000	0.87
Whether received other aid in 1983-84 famine	-0.026	-1.38	-0.027	-1.54
Whether received other aid in 1991-93	0.037	2.31	0.036	2.30
<i>F-test on interaction terms (p-values)</i>				
Sex x individual characteristics=0			14.95	0.00
Sex x household demographics=0			1.87	0.93
Sex x assets=0			2.83	0.24
Sex x community shocks=0			0.04	0.85
Sex x household shocks=0			3.47	0.18
All interactions=0			25.85	0.04
All gender terms=0			66.90	0.00
Observed probability	0.13		0.13	
Predicted probability	0.07		0.07	
Number of observations	1,837		1,837	
Wald test (Chi-square)	287.76		323.23	
Prob > chi2	0.00		0.00	
Pseudo R2	0.22		0.23	

Notes: Regressions included round and village dummies, which are not reported here. z -statistics in bold are significant at 10 percent or better.

Table 6. Determinants of participation in self-employment, with and without gender interactions, individuals 15-65

Villages with public works in specific round, Rounds 1-3

Probit estimates with robust standard errors, marginal effects reported

	Without interactions		With interactions	
	dF/dX	z	dF/dX	z
<i>Individual characteristics</i>				
Sex (1 = female)	-0.001	-0.04	-0.131	-0.57
Age in years	0.008	2.28	0.008	2.00
Age in years squared	0.000	-2.44	0.000	-2.24
Highest grade attained	-0.017	-2.30	-0.012	-1.42
Height	0.001	1.23	0.000	0.65
<i>Sex x individual characteristics</i>				
Age x female			-0.002	-0.28
Age2 x female			0.000	0.35
Education x female			-0.017	-1.16
Height x female			0.001	0.42
<i>Household characteristics</i>				
Age of household head	0.000	0.02	0.000	-0.16
Education of household head	-0.003	-0.51	-0.003	-0.70
Female-headed households	-0.001	-0.05	-0.006	-0.24
<i>Household demographics</i>				
Ln of household size	-0.017	-1.02	-0.021	-0.95
Children 0-3 (ratio)	-0.038	-0.57	-0.021	-0.24
Children 3-7 (ratio)	-0.012	-0.24	0.016	0.22
Children 7-15 (ratio)	-0.011	-0.22	-0.010	-0.15
Females 15-65 (ratio)	-0.028	-0.56	-0.094	-1.23
Over 65 (ratio)	-0.075	-0.69	-0.277	-1.37
<i>Sex x household demographics</i>				
Ln household size x female			0.008	0.27
Children 0-3 x female			-0.002	-0.02
Children 3-7 x female			-0.047	-0.46
Children 7-15 x female			0.019	0.24
Females 15-65 x female			0.123	1.22
Over 65 x female			0.414	1.53
<i>Assets</i>				
Land in hectares (Round 1)	0.011	1.17	0.015	1.46
Value of livestock in Round 1 (1997 birr)	0.000	-0.75	0.000	0.18
<i>Sex x assets</i>				
Land in Round 1 x female			-0.011	-0.65
Livestock in Round 1 x female			0.000	-1.13
<i>Community shocks</i>				
Community rainfall index (1 is best, leave-out mean)	-0.267	-3.52	-0.332	-4.56
<i>Household shocks (1 is best)</i>				
Rainfall index	-0.003	-0.18	0.032	1.73
Livestock index	0.027	1.49	0.032	1.16
<i>Sex x community shocks</i>				
Community rainfall index x female			0.132	2.12
<i>Sex x household shocks</i>				
Rainfall index x female			-0.069	-2.65
Livestock index x female			-0.007	-0.20
<i>History of shocks and aid received</i>				
Kilograms of wheat received in 1983-84 famine	0.000	-0.84	0.000	-0.73
Kilograms of wheat received in 1991-93	0.000	-2.29	0.000	-2.30
Whether received other aid in 1983-84 famine	0.025	1.36	0.024	1.42
Whether received other aid in 1991-93	0.006	0.36	0.004	0.25
<i>F-test on interaction terms (p-values)</i>				
Sex x individual characteristics=0			2.25	0.69
Sex x household demographics=0			5.08	0.53
Sex x assets=0			2.37	0.31
Sex x community shocks=0			4.51	0.03
Sex x household shocks=0			7.51	0.02
All interactions=0			19.00	0.21
All gender terms=0			19.16	0.26
Observed probability	0.09		0.09	
Predicted probability	0.05		0.04	
Number of observations	1,837		1,837	
Wald test (Chi-square)	202.65		269.43	
Prob > chi2	0.00		0.00	
Pseudo R2	0.19		0.21	

Notes: Regressions included round and village dummies, which are not reported here. z -statistics in bold are significant at 10 percent or better.

Table 7. Determinants of days worked, wage per day, and earnings from wage labor, Heckman two -step estimates, individuals 15-65

Selection equation as specified in Table 4

	Days worked		Wage per day		Earnings	
	Earnings coefficient	z	Earnings coefficient	z	Earnings coefficient	z
<i>Individual characteristics</i>						
Sex (1 = female)	382.704	1.83	40.918	0.78	909.774	0.69
Years of schooling	5.626	1.81	0.180	0.23	49.980	2.64
Experience	-0.090	-0.06	0.792	2.05	13.856	1.86
Experience squared	0.006	0.20	-0.014	-1.76	-0.202	-1.17
Height	0.392	0.70	0.378	2.67	5.388	1.79
<i>Sex x individual characteristics</i>						
Years of schooling x female	1.826	0.25	0.488	0.26	-23.610	-0.48
Experience x female	-4.101	-1.09	-0.272	-0.29	-1.245	-0.05
Experience squared x female	0.074	0.86	0.004	0.18	-0.037	-0.08
Height x female	-2.745	-1.66	-0.261	-0.80	-5.698	-0.72
Constant	-76.790	-0.69	-81.055	-2.90	-1,465.894	-2.15
Lambda	2.745	0.19	5.171	1.39	107.350	1.21
Number of observations	1,837		1,837		1,837	
Censored observations	1,718		1,718		1,546	
Uncensored observations	119		119		291	
Wald chi2(92)	73.11		58.1		102.12	
Prob > chi2	0.00		0.00		0.00	

Notes: Regressions included round and village dummies, which are not reported here. z-statistics in bold are significant at 10 percent or better.

Table 8. Determinants of days worked, wage per day, and earnings from food for work, Heckman two -step estimates, individuals 15-65

Selection equation as specified in Table 5

	Days worked		Wage per day		Earnings	
	Coefficient	z	Coefficient	z	Coefficient	z
<i>Individual characteristics</i>						
Sex (1 = female)	-56.358	-1.01	-1.455	-0.14	-304.309	-0.94
Years of schooling	0.174	0.22	0.216	1.40	8.514	1.82
Experience	-0.879	-2.28	0.088	1.18	1.090	0.49
Experience squared	0.016	2.09	-0.002	-1.11	-0.022	-0.49
Height	0.316	1.68	-0.025	-0.69	-0.352	-0.32
<i>Sex x individual characteristics</i>						
Years of schooling x female	-2.523	-1.10	0.001	0.00	-7.805	-0.58
Experience x female	-0.031	-0.04	-0.032	-0.23	-2.270	-0.53
Experience squared x female	0.006	0.30	0.000	-0.04	0.041	0.33
Height x female	0.360	1.00	0.012	0.17	2.052	0.98
Constant	-10.510	-0.31	7.626	1.18	177.693	0.91
Lambda	2.170	0.39	-0.947	-0.87	-14.588	-0.44
Number of observations	1,837		1,837		1,837	
Censored observations	1,594		1,594		1,593	
Uncensored observations	243		243		244	
Wald chi2(92)	386.64		164.92		152.05	
Prob > chi2	0.00		0.00		0.00	

Notes: Regressions included round and village dummies, which are not reported here. z-statistics in bold are significant at 10 percent or better.

Table 9. Determinants of days worked, wage per day, and earnings from self-employment, Heckman two -step estimates, individuals 15-65

Selection equation as specified in Table 6

	Days worked		Wage per day		Earnings	
	Coefficient	z	Coefficient	z	Coefficient	z
<i>Individual characteristics</i>						
Sex (1 = female)	-131.301	-1.07	162.971	2.80	845.509	0.96
Years of schooling	3.610	1.03	0.201	0.12	19.302	0.77
Experience	1.543	1.10	-1.729	-2.57	7.822	0.77
Experience squared	-0.056	-1.73	0.031	2.03	-0.279	-1.19
Height	-0.420	-0.74	1.035	3.76	9.711	2.36
<i>Sex x individual characteristics</i>						
Years of schooling x female	-17.438	-1.95	0.492	0.12	-94.864	-1.47
Experience x female	-0.497	-0.30	1.579	2.01	-0.285	-0.02
Experience squared x female	0.032	0.86	-0.028	-1.61	0.114	0.43
Height x female	0.874	1.12	-0.125	-3.05	-5.122	-0.92
Constant	33.644	0.35	-89.532	-1.91	-1,757.061	-2.49
Lambda	30.409	2.43	-7.191	-1.22	166.542	1.86
Number of observations	1,837		1,837		1,837	
Censored observations	1,664		1,664		1,662	
Uncensored observations	173		173		175	
Wald chi2(92)	111.29		135.43		125.31	
Prob > chi2	0.00		0.00		0.00	

Notes: Regressions included round and village dummies, which are not reported here. z-statistics in bold are significant at 10 percent or better.

Table 10. Characteristics of public works programs, 1997, village averages

	N	Mean	Standard deviation
<i>Information from public works module (1997 household survey)</i>			
Proportion with infrastructure projects	7	0.71	0.45
Proportion with forestry projects	7	0.43	0.49
Proportion with soil conservation projects	7	0.71	0.45
Proportion with water supply or irrigation projects	7	0.43	0.49
Proportion with social services projects	7	0.57	0.49
Average distance to public works site (kilometers)	7	3.25	2.81
<i>Information from key informant interviews (2003)</i>			
Number of employees	7	449.64	516.71
Employment duration	7	149.64	160.51
Market wage (if labor market exists)	7	4.13	0.63
Wage per day in public works	4	3.44	2.47
Proportion of villages paying wages in kind	7	0.71	0.45
Proportion of villages where projects paid higher than the market wage, if the latter exists	4	0.57	0.49
Proportion of villages with government projects	7	0.57	0.49
Proportion of villages allocating jobs based on assets (fewer assets preferred)	7	0.71	0.45
Percentage of women	7	26.00	19.44
Proportion of villages giving priority to women in job allocations	7	0.14	0.35
Proportion of villages where jobs were rationed	7	0.43	0.49
Proportion reporting that job allocation was fair	7	0.86	0.35
Proportion of villages in which women participated in public works	7	1.00	0.00
Proportion of villages with crèches	7	0.14	0.35
Proportion of villages targeting women	7	0.43	0.49
Proportion of villages where women were specially informed	7	0.14	0.35
Proportion of villages where men and women were paid the same wage	7	1.00	0.00
Proportion of villages where men and women had the same jobs	7	0.57	0.49

Note: See details in text.

Table 11. Participation and earnings from public works, and characteristics of public works programs, Round 4
Seven villages with specific program information
All monetary variables in 1997 birr

Variable	Male			Female		
	N	Mean	Standard deviation	N	Mean	Standard deviation
<i>Overall</i>	801			868		
Number of participants (a)	203			121		
Proportion participating in public works, last 12 months		0.23	0.37		0.12	0.31
Days worked in public works, last 12 months, participants only	165	30.18	43.14	91	46.82	68.20
Earnings per day from public works, last 12 months, participants only	142	9.73	11.74	75	75.00	11.80
Earnings from public works, last 12 months, participants only	203	155.47	174.84	121	169.76	184.30
<i>Infrastructure projects</i>						
Number of participants (a)	94			39		
Proportion participating in infrastructure projects		0.12	0.30		0.04	0.20
Days worked in public works, last 12 months, participants only	94	20.61	15.98	37	13.78	6.55
Earnings per day from public works, last 12 months, participants only	75	14.91	13.51	32	17.88	14.37
Earnings from public works, last 12 months, participants only	93	196.89	95.33	39	197.73	88.02
<i>Soil conservation projects</i>						
Number of participants (a)	31			36		
Proportion participating in soil conservation projects		0.04	0.19		0.04	0.20
Days worked in public works, last 12 months, participants only	30	34.87	46.88	34	49.79	61.19
Earnings per day from public works, last 12 months, participants only	28	16.63	61.48	33	4.46	4.14
Earnings from public works, last 12 months, participants only	31	155.33	117.36	36	148.97	133.68
<i>Forestry projects</i>						
Number of participants (a)	17			19		
Proportion participating in forestry projects		0.02	0.14		0.02	0.14
Days worked in public works, last 12 months, participants only	11	52.36	103.37	10	72.70	104.39
Earnings per day from public works, last 12 months, participants only	11	3.94	1.09	10	4.07	1.40
Earnings from public works, last 12 months, participants only	17	142.28	244.55	19	229.25	242.11
<i>Water supply, social services, and other projects</i>						
Number of participants (a)	25			7		
Proportion participating in water supply, social services, and other projects		0.03	0.17		0.01	0.09
Days worked in public works, last 12 months, participants only	25	42.60	53.35	6	176.00	85.08
Earnings per day from public works, last 12 months, participants only	22	6.29	6.49	6	2.06	1.93
Earnings from public works, last 12 months, participants only	23	146.38	155.25	7	303.73	441.96

Note: Individuals age 15-65, with complete information on individual and household characteristics.
(a) Number of participants is based on the number of individuals reporting days worked or earnings, whichever is larger.

Table 12. Determinants of participation in public works, 1997, individuals 15-65
Probit estimates with robust standard errors, marginal effects reported

	Without interactions		With interactions	
	dF/dX	z	dF/dX	z
<i>Individual characteristics</i>				
Sex (1 = female)	-0.086	-2.35	-0.557	-0.75
Age in years	0.013	1.67	0.025	2.60
Age in years squared	0.000	-1.71	0.000	-2.55
Highest grade attained	-0.024	-2.71	-0.023	-2.61
Height	0.005	2.36	0.002	0.95
<i>Sex x individual characteristics</i>				
Age x female			-0.023	-1.56
Age2 x female			0.000	1.32
Education x female			-0.008	-0.46
Height x female			0.005	1.41
<i>Household characteristics</i>				
Female-headed households	0.025	0.43	0.029	0.53
<i>Household demographics</i>				
Ln of household size	0.000	0.00	0.007	0.17
Children 0-3 (ratio)	0.024	0.12	-0.053	-0.24
Children 3-7 (ratio)	0.374	2.38	0.408	2.43
Children 7-15 (ratio)	0.168	1.15	0.348	2.48
Females 15-65 (ratio)	0.046	0.32	0.173	1.19
Over 65 (ratio)	0.414	1.39	0.325	0.83
<i>Sex x household demographics</i>				
Ln household size x female			-0.006	-0.09
Children 0-3 x female			0.053	0.16
Children 3-7 x female			-0.262	-1.19
Children 7-15 x female			-0.536	-2.68
Females 15-65 x female			-0.421	-2.01
Over 65 x female			0.109	0.25
<i>Program variables (infrastructure is excluded)</i>				
Soil conservation program present	0.041	0.49	0.077	1.11
Forestry program present	0.016	0.33	-0.029	-0.62
Water, social services, or other program present	-0.257	-2.84	-0.238	-2.58
Government project	0.163	2.95	0.147	2.82
Distance to site	-0.020	-1.40	-0.013	-1.17
<i>Sex x program variables</i>				
Soil conservation x female			-0.171	-1.52
Forestry x female			0.071	0.74
Water or social services x female			-0.046	-0.36
Government project x female			0.085	0.84
Distance x female			-0.046	-1.76
<i>Assets</i>				
Land in hectares (Round 1)	0.032	1.85	0.030	1.62
Value of livestock in Round 1 (1997 birr)	0.000	-1.80	0.000	-1.58
<i>Sex x assets</i>				
Land in Round 1 x female			-0.017	-0.57
Livestock in Round 1 x female			0.000	-1.12
<i>Community shocks</i>				
Community rainfall index (1 is best, leave-out mean)	-0.433	-3.07	-0.484	-3.19
<i>Household shocks (1 is best)</i>				
Rainfall index	0.163	2.42	0.158	2.22
Livestock index	0.044	0.23	-0.062	-0.33
<i>Sex x community shocks</i>				
Community rainfall index x female			0.242	1.11
<i>Sex x household shocks</i>				
Rainfall index x female			-0.001	-0.01
Livestock index x female			0.476	1.68
<i>F-test on interaction terms (p-values)</i>				
Sex x individual characteristics=0			5.47	0.24
Sex x household demographics=0			11.83	0.07
Sex x program variables=0			11.24	0.05
Sex x assets=0			1.97	0.37
Sex x community shocks=0			1.22	0.27
Sex x household shocks=0			2.90	0.23
All interactions=0			38.52	0.01
All gender terms=0			44.35	0.00
Observed probability	0.18		0.18	
Predicted probability	0.13		0.11	
Number of observations	625		625	
Wald chi2(44)	85.3		122.68	
Prob > chi2	0.00		0.00	
Pseudo R2	0.17		0.23	

Note: z-statistics in bold are significant at 10 percent or better.

Table 13. Days worked, wages per day, and earnings from public works, 1997
Individuals 15-65, seven villages with program information
Heckman two-step estimates, selection equation with full interactions as in Table 12

	Days worked		Wage per day		Earnings	
	Coefficient	z	Coefficient	z	Coefficient	z
<i>Individual characteristics</i>						
Sex (1 = female)	233.451	0.79	2.279	0.07	-448.471	-0.34
Years of schooling	-7.558	-1.51	-0.797	-1.50	-26.373	-1.11
Experience	1.550	0.83	-0.037	-0.19	9.469	1.12
Experience squared	-0.040	-1.00	0.001	0.27	-0.296	-1.61
Height	0.498	0.45	0.068	0.55	-5.469	-1.01
<i>Sex x individual characteristics</i>						
Years of schooling x female	3.189	0.38	0.635	0.73	14.568	0.40
Experience x female	-7.970	-2.00	0.286	0.70	-20.382	-1.40
Experience squared x female	0.165	1.80	-0.007	-0.78	0.507	1.54
Height x female	-0.849	-0.47	-0.008	-0.04	4.937	0.63
<i>Program variables</i>						
Soil conservation program present	-25.497	-1.20	5.046	2.32	5.404	0.06
Forestry program present	41.935	3.00	-4.826	-3.28	61.748	1.03
Water, social services, or other program present	27.080	1.81	-4.844	-2.91	33.893	0.50
Government project	25.112	1.73	2.909	1.92	163.887	2.54
Distance to site	-3.248	-1.84	0.063	0.32	-12.908	-1.73
<i>Sex x program variables</i>						
Soil conservation x female	-24.503	-0.56	-8.670	-1.90	-280.927	-1.49
Forestry x female	-40.634	-1.34	4.865	1.56	-63.074	-0.47
Water, social services, or other x female	-17.666	-0.55	-3.771	-1.11	-105.522	-0.72
Government project x female	-5.571	-0.16	5.746	1.74	2.334	0.02
Distance x female	8.297	0.92	-1.078	-1.09	-10.473	-0.28
Constant	-53.388	-0.27	-8.386	-0.38	980.873	1.01
Lambda	-2.185	-0.13	4.426	3.06	36.251	0.56
<i>F-test on interaction terms in main and selection equations (p-values)</i>						
Sex x individual characteristics=0	1.99	0.92	2.46	0.87	7.73	0.26
Sex x household demographics=0	2.53	0.86	5.00	0.54	5.25	0.51
Sex x program variables=0	20.05	0.03	19.89	0.03	22.85	0.01
Sex x assets=0	4.83	0.09	3.86	0.15	5.21	0.07
Sex x community shocks=0	0.15	0.70	0.91	0.34	0.09	0.77
Sex x household shocks=0	1.30	0.52	1.57	0.46	1.97	0.37
All interactions=0	30.82	0.28	31.96	0.23	41.11	0.04
All gender effects=0	36.45	0.16	34.65	0.22	42.12	0.05
Number of observations	625		625		625	
Censored observations	526		540		528	
Uncensored observations	99		85		97	
Wald chi2(25)	89.41		123.47		92.90	
Prob > chi2	0.00		0.00		0.00	

Note: z-statistics in bold are significant at 10 percent or better.

Table 14. Reasons for nonapplication and nonparticipation in public works, by sex, 1997

Individuals 15-65 with information in public works module, seven villages with program data

	Male		Female	
	Frequency	Percent	Frequency	Percent
<i>Applied for work to the public works work program</i>				
Yes	267	23.1	180	14.16
No	889	76.9	1,091	85.84
<i>For nonapplicants, reasons for not applying</i>				
Too weak/sick	75	8.65	111	10.38
Too young/old	100	11.53	176	16.46
Pregnant			34	3.18
Pay too low	21	2.42	7	0.65
Only poor work on such projects	7	0.81	8	0.75
Other job opportunities	45	5.19	22	2.06
Need labor on farm	284	32.76	48	4.49
Conflict with childcare/other responsibilities	29	3.34	285	26.66
Did not consider project useful			2	0.19
Did not like form of payment	1	0.12	5	0.47
Perceived no chance of being hired	108	12.46	130	12.16
No need	55	6.34	84	7.86
No jobs being offered	125	14.42	150	14.03
Studying	10	1.15	5	0.47
Not around	7	0.81	2	0.19
<i>If you applied, were you hired?</i>				
Yes	212	80.3	129	75.44
No	52	19.7	42	24.56
<i>Reason for not being hired</i>				
Too weak/sick	8	12.31	4	6.78
Too young/old	2	3.08	1	1.69
Not enough places	39	60.00	38	64.41
Conflict with PW staff/agents	5	7.69	5	8.47
Other	7	10.77	8	13.56
Considered richer	4	6.15	3	5.08
<i>Did you work in any other program?</i>				
Yes	221	92.47	132	87.42
No	18	7.53	19	12.58
<i>If not, why didn't you work on another program?</i>				
Too weak/sick	3	21.43	5	33.33
Too young/old			2	13.33
Pay too low	1	7.14		
Only poor work on such projects	1	7.14		
Other job opportunities	1	7.14		
Need labor on farm	1	7.14	2	13.33
Conflict with childcare/other responsibilities			1	6.67
Perceived no chance of being hired	4	28.57	4	26.67
No need	1	7.14		
Not indicated	2	14.29	1	6.67
<i>Would you have wanted to work more?</i>				
Yes	190	91.35	114	91.20
No	18	8.65	11	8.80
<i>Reason for not wanting to work more</i>				
Project ended	180	80.00	46	60.53
No more work available due to rationing	14	10.37	12	15.79
Did not like form of payment			1	1.32
Work was too hard/too far	1	0.74	2	2.63
Physically unable to continue			4	5.26
Needed to work on own farm	7	5.19	6	7.89
Had other responsibilities	1	0.74	1	1.32
Had other job opportunities			1	1.32
Conflict with PW staff/agents			1	1.32
Unfairness in hiring	1	0.74	1	1.32
Other	3	2.22	1	1.32

Source: 1997 ERHS, public works module.

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