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Intrahousehold welfare
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Labor-intensive jobs for women and development: Intrahousehold welfare effects and its transmission channels

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December 2015

Abstract

We examine the welfare impacts of women getting low-skilled jobs and find large positive effects, both at the household and the individual level. However, the women workers, their husbands and their oldest daughters reduced their leisure, but women to a much larger extent than the others. The leisure of the oldest son did not change. Investigating the transmission mechanisms suggests that the impacts did not only go through income and substitution effects, but also through a bargaining effect. Getting the job likely improved the bargaining position of the wife through several mechanisms, which in turn added to the positive impact on her welfare.

Keywords: salaried employment, wage labor, gender, bargaining, consumption, poverty, hunger

1. Introduction

Growth in labor-intensive industries, especially those that employ the poor, is believed to be major route out of poverty for developing countries, particularly those in Sub-Saharan Africa (Loayza and Raddatz 2010, Rodrik 2015). However, very little is known about the welfare impacts of such jobs at the micro level where the first-order effects of such transitions may be identified (Blattman and Dercon 2015). Moreover, there is surprisingly little solid evidence about the transmission mechanisms through which the job may change the intrahousehold welfare allocations, including the links between women employment, bargaining power and individual outcomes. In this paper, we study the impacts on intrahousehold welfare of women transitioning from traditional activities into formal salaried low-skilled employment and assess the income, substitution and bargaining effects.

A sector's poverty-reducing capacity may be related to the degree to which it employs unskilled labor, since the poor can provide their labor as a production input (Loayza and Raddatz 2010). Such employment may provide a direct link between economic growth and poverty reduction and hence, policymakers have used many resources to attract such investments through financing special economic zones, regulatory frameworks and direct subsidies (World Bank 2013). In addition, much of the low-skilled industries employ mostly women, and increased earnings of women is believed to be particularly important for investments in their children's nutrition, health and education that in turn would enhance the long-run poverty reducing effects (Duflo 2012). Jobs are also believed to be important for gender equality by improving the position of women and their bargaining power and hence creates an additional interest from policymakers (Duflo 2012).

In theory, the equilibrium wage is determined by the marginal product of the worker, factor prices are equalized across sectors and the utility of the worker of getting the job would be equal to her counterfactual outcome. Hence, in low-skilled industries where there are no minimum wages or labor unions, monitoring is costless and there is abundance of labor, one would predict that the welfare effect of getting such a job would not be substantial. This is indeed what Blattman and Dercon (2015) find in manufacturing industries.

However, higher wages and worker utility can be maintained in imperfect markets, but also between equilibria that in our setting typically is modelled as a structural transformation where manufacturing

growth attracts labor from traditional rural agriculture by offering higher wages.¹ We find large positive household welfare effects from women getting low-skilled jobs in the rose farm sector in rural Ethiopia. The effects are strong along all indicators used; consumption, income, various poverty measures, food security and hunger indicators.

We identify effects by comparing women who got a job in the cut flower industry with similar women who also applied for jobs, but for various reasons never started working. This accounts for self-selection into job search. Moreover, the hiring of workers in the sector is claimed to be random by all involved parties; farms recruit those who show up for work at the farm gate. Our inspection of the hiring process and qualitative work suggests the same; farm management use no energy on screening the thousands of applicants (e.g. no formal interview processes or assessment of candidates other than visual inspection), no education or experience is required. In addition, the work-tasks are very simple and unproductive labor can easily be laid off in a probation period. Moreover, there are insignificant differences between hired and non-hired women at the time they applied along most of the relevant indicators. Instrumenting yields the same result qualitatively; selection bias seems not to matter much to the results.

Most likely, our results differ from those of Blattman and Dercon (2015) due to the counterfactual of getting a job. In the poor rural areas we study, the alternatives to formal employment for women are less attractive. They typically involve domestic work without pay (household chores), to run microbusinesses with very low returns, or to contribute in traditional household agriculture. We find that having a job at the rose farms is highly appreciated and that turnover rates are relatively low. On the other hand, in the better functional labor markets in urban and semi-urban areas studied by Blattman and Dercon, they find that many workers' alternatives are to get another formal/semi-formal job or to engage in businesses with higher returns. Many of their outside alternatives are more attractive in these areas, and as many as 77% of the workers in the study companies had quit within a year.

Effects at the overall household level, or at the worker level, may disguise important intrahousehold differences in welfare allocations. We find large differences in changes of leisure demand that conforms to what is typically labelled as women “double” or “triple” working when she takes care of most of the

¹ The most famous early model of such a structural transformation was formulated by Arthur Lewis (Lewis 1954). However, the key element of maintaining higher wages during transitions from one steady state to another can be found in a much wider spectrum of models relevant for the Ethiopian setting with large expansion in rose farming in a short time horizon. Moreover, such differentials can be maintained when union bargaining results in higher wages (Card 1996) or when there is labor poaching or efficiency wages (Katz et al. 1989, Shapiro and Stiglitz 1984, Akerlof and Yellen 1986) and in labor markets where learning is important (see the literature on learning and matching, for example Papageorgiou 2014).

traditional household responsibilities in addition to a full time job. Women who got the job reduced their leisure by more than two hours a day, which led to retrenchment of time for sleep. Husbands and older daughters also reduced their leisure, but much less dramatically, while there were no changes for the sons' leisure.

According to Ashraf (2009), intrahousehold bargaining may be crucial in order to understand the welfare distributions within the household. Following the reasoning of cooperative household models, an improvement in women's bargaining power changes the resource allocation more in favor of the women's priorities (Von-Braun 1989, Sen 1990, Thomas, 1990, 1994; Engle 1993; Hoddinott and Haddad, 1995; Duflo, 2003). Therefore, if women securing formal, permanent employment also improves their bargaining position within the household, one may expect that the allocations of welfare within the household is skewed towards the women (Duflo 2012). We indeed find that bargaining power increases among the hired women, and that this changes the resource allocation in a way that causes an additional improvement in female welfare.

Our study relates to a small literature that identify and quantify causal effects of industrial employment on intra household decisions. Jensen (2012) and Heath and Mobarak (2014) finds that improvements in labor market opportunities for women leads to reduced fertility, postponed marriage and that women take more education. Blattman and Dercon (2015), perhaps the study closest to ours, find that being offered a job in various industries in Ethiopia does not lead to any different impacts for the workers in terms of average hours worked, income, and wages as compared to a control group that was not offered a job.

Most empirical welfare analysis still focuses on total household impacts rather than the intrahousehold distributional effects (Ashraf 2009). Our work relates to the intrahousehold bargaining literature, which suggests that the allocations within the household is the most important determinant of aggregate inequality in poor countries (Haddad and Kanbur 1990 and Dercon and Krishnan 2000). We show that failing to account for the intrahousehold allocations may lead to misleading conclusions about the impacts of employment, and also to a lack of understanding the transmission mechanisms behind the outcomes. Husbands are usually the household heads with more decision making power over the allocation of household goods than the wife (see for example Lim et al. 2007). Some husbands may even confiscate the wife's income to spend it on his own consumption (Anderson and Baland 2002) or spend more on himself when that is not revealed to his spouse (Ashraf 2009). In addition, other family members, such as older children, may be affected by the relative bargaining power between the spouses. When the women gets a job, it has been found that older children step in to take care of younger siblings and contribute to

household chores (World Bank, 2012). It may matter a lot to outcomes whether gender inequalities are reinforced by pulling the oldest girl out of school for such purposes, or if the tasks are more equally distributed in the household.

In addition, there is also a descriptive literature discussing correlates between individual and household characteristics and job opportunities. (Henderson 1997, Combes 2000, Blien et al. 2006, Sonobe et al. 2013). Although no causal impact can be detected from such studies, there are varying suggestions about the degree to which these jobs bring about improvements in the workers lives – ranging from labels of distress sale of labor while others described it as an important means to empower unskilled poor rural women (Ilahi 2000, Doss 2011). Moreover, using Spanish data, Carrasco and Zamora (2010) suggests that when women got salaried employment, it led to an increase in consumption of most household commodities. Likewise, using survey data from poor urban women in India, Salway, Rahman and Jesmin (2003) found significant and multifaceted improvements in livelihood from female employment. Our findings on impacts on poverty are similar to the suggestions of previous studies such as Martin and Robert (1984) and Stier and Lewin (2002). This also links to the food security literature. Our results suggest that the job significantly improved their food security, which is similar to the findings of Chiappori (1988), Von Braun (1989), Thomas (1994), Hoddinott and Haddad (1995) and Duflo (2003).

2. Context

The flower industry in Ethiopia emerged in the late 1990s and started to export in early 2000s. In 2002, only three flower farms were exporting but other investors quickly realized the potential.² Today around 100 commercial flower farms are in operation and more than 85,000 direct low-skilled jobs has been created in the sector. In addition, this has created a large number of indirect jobs for the neighboring rural communities, mostly for unskilled women who are believed to lack income opportunities (EHPEA 2013). Moreover, the whole horticulture sector has grown tremendously during the last decade, based on the same type of production offering the same type of low-skilled jobs and EHPEA claims it employs 180,000 workers.³

² The government initiated a policy package in 2003 that marked start of the tremendous growth. The GoE allocated large areas of land (1000 ha) for flower productions and provided electricity, telecommunication services and long-term credit at affordable interest rate to both foreign and domestic investors (Gebreyesus and Lizuka 2012).

³ Schaefer and Abebe (2015) questions the EHPEA's figures. In a comparison from 2011/12, they find that survey based estimates is around half of what is claimed by EHPEA (2013).

This type of production is highly labor intensive and international competition in the product market is fierce (Hortiwise 2012). Hence, the availability of cheap labor was likely an important condition for the expansion. Widespread poverty and abundance of unskilled labor ensures the availability of workers at internationally competitive wages in the commercial horticulture areas. In rural Oromia almost every third household was below the national poverty line of approximately USD 0.5 per day in 2010/11 (MoFED 2012). Nevertheless, the daily wage for an unskilled rose farm worker was less than one USD, which was comparable to the daily support that the food-insecure individuals would get in public works projects to prevent hunger.

The low levels of skills and education are reflected in the illiteracy rates; for women in Oromia it was 62% while it was only 32% for men (CSA and ICF International, 2012). The gender disparities in education underline the disadvantaged situation for women in the area: Almost half of the women in Oromia do not have any education compared to 26% of the men. Similarly, only 37% of the women have some primary education while around half of the men are in that category. The weak position of the women gives an indication of the unequal power balance between the workers and the farm management, which is exacerbated by the absence of functioning trade unions. Although the national trade union has organized most of the commercial farms, there are few opportunities for the workers to raise issues of concern. The management has actively discouraged unions both through termination of employment and promotions to redirect their focus and it is usually not clear for the women workers what is the purpose of the unions and what they do (Aman 2011, Villanger, Getahun and Solomon 2015).

The country also suffers from large gender inequalities, despite several recent positive policy reforms (Mabsout and Staveren 2010). Very few Ethiopian women make household decisions by themselves. Only half of the women participate with their husbands in all of three decisions on issues like her own health care, household purchases and her own visits to her family or relatives, and almost three times more men than women owns assets such as a house or have use rights over land (CSA and ICF International, 2012). Even when the women do own or have rights to assets, these assets are usually controlled by men (Lim et al. 2007). Also suggestive of large intrahousehold power imbalances, domestic violence is common and accepted by both men and women. In parts of Ethiopia, 71 % of ever-partnered women have been physically assaulted by a male partner (Garcia-Moreno et al. 2005) and 76 % of all women in rural Ethiopia agrees that it is justified for a husband to beat his wife for some specific reason (CSA and ICF International, 2012).

The “land grabbing” debate is also part of this context as the rose farm expansions require large areas to reach a profitable scale of cultivation (see for example Hall 2011). Since all land in Ethiopia is owned by the state, it has been relatively straightforward for the government to reallocate large land areas from local populations to commercial farms. However, most of the local population makes a living from agriculture. With diminishing plot sizes due to population growth, with few and poor alternative income generating opportunities, and with a continuous food deficit, a lot of critique has been raised against using productive land to flower cultivation.

The rose farm industry also has a hazardous working environment. The production could cause water, air and soil pollution because of its intensive and unregulated chemical usage and poor waste disposal management (Organic Consumers Association 2006). Several women workers and their husbands did complain about the potential negative health impacts of exposure to chemicals (Villanger, Getahun and Solomon 2015). Moreover, the flower sector is characterized by its intensive use of water, which is said to have negatively impacts on the adjacent farmers who rely on the ground water for their crop cultivation and cattle breeding (Fatuma 2008 and Getu 2009).

3. Theoretical Model

We mainly use consumption as the welfare indicator since it captures the means by which households can achieve welfare (Deaton 1997, Strengmann-Kuhn 2000, Wagle 2007). To model consumption demand, we use a modified version of the Browning and Chiappori (1988) cooperative collective household model that highlights intrahousehold conflicts and gender based power disparities (Browning, Chiappori and Weiss 2011). Although Pareto efficiency of intrahousehold allocation does not always hold, as shown by Udry (1996), we see no compelling argument that the bargaining over consumption in our setting would yield inefficient solutions.

Assume that the husband and the wife are the only decision makers in the household and that the spouses care about their own and their partner’s consumption and leisure. Accordingly, the preferences of each spouse is represented by a direct utility function⁴ that allows altruism and externality, where the husbands utility, U^h , and the wife’s utility, U^w , are given by

⁴ The utility functions are assumed to be strictly concave and twice differentiable in all of their arguments.

$$U^h(Q, C, q^h, q^w, c^h, c^w, l^h, l^w) \quad \text{and} \quad U^w(Q, C, q^h, q^w, c^h, c^w, l^h, l^w) \quad (1)$$

where superscripts “h” and “w” refer to husband and wife, Q and q denotes the respective vectors of purchased public and private goods, l denotes leisure demand. Let C and c denote the vectors of home produced public and private goods, respectively. The private goods are divided between the couples in such a way that the husband receives q^h and the wife receives q^w so that $q = q^h + q^w$.

The decision choice problem of the Pareto efficient household is then algebraically represented by the following maximization program (see also Browning, Chiappori and Weiss 2011):

$$\max_{Q, q^h, q^w, l^h, l^w, c^h, c^w, C} \{(1 - \mu)U^h(Q, C, q^h, q^w, c^h, c^w, l^h, l^w) + \mu U^w(Q, C, q^h, q^w, c^h, c^w, l^h, l^w)\} \quad (2a)$$

Subject to

$$P'Q + p'(q^h + q^w) \leq W^h L_m^h + Y^{nl} \quad (2b)$$

$$l^h + L_m^h + L_D^h = 1 \quad \& \quad l^w + L_m^w + L_D^w = 1 \quad (2c)$$

$$C(C_j^h, c_j^h, c_j^w) = C(L_D^h, L_D^w) \quad (2d)$$

Where $\mu = \mu(P, p, W^h, W^w, Y^{nl}, z)$ and $W^h, W^w, l^h, l^w, L_m^h, L_m^w$, and Y^{nl} denotes the hourly wage rate of the husband, the hourly wage rate of the wife, leisure hour of the husband, leisure hour of the woman, outside home working hour of the husband, outside home working hour of the wife and the overall non-labor income of the household respectively. P and p denote the vectors of prices of the purchased public and private goods, respectively. The Pareto weight μ represents the relative bargaining power of the women and depends on the vector of prices, income and distributional factors.⁵ In the present context, differences in the spouses' age, education and wage after controlling the total effect of age, education and income are used as a proxy for distributional factors.

In compliance with the data set and the purpose of the study, we also assume that the husband always works at the market for a predetermined quantity of time while the woman choose whether to work or not at the market. Hence, labor supply for the husband is upward sloping and exogenous to the model. Under this assumption and normalizing the price, the female labor supply and the household consumption demand function can be derived as the unique solution of the household utility optimization problem (2a-2d).

⁵ Bourguignon, Browning and Chiappori (1994) defined the distributional factors as a set of variables that have an impact on the decision process but affects neither preferences nor budget constraints.

$$D_j = D(W^w, Y^{nw}, \mu(Y^{nl}, W^h, W^w, z)) \quad (3a)$$

$$L_m^w = L_m^w(W^w, Y^{nw}, \mu(Y^{nl}, W^h, W^w, z)) \quad (3b)$$

Where $L_m^w \in [0, 1]$ $Y^{nw} = Y^{nl} + W^h L_m^h$ and $D_j = (Q_j, q_j^h; q_j^w)'$, $j=1, 2, 3, \dots$, n indicates the list of consumption items.

Hence, the female labor force participation and consumption demand are jointly determined. The derived household demand function (3a), unlike the standard Marshallian demand function, depends not only on the total household budget but also on the relative bargaining power of the women. An increase in the woman's earnings will impact consumption and leisure demand (flip side of labor supply) of the women and the household not only through the standard income and substitution effects but also through the distinguished bargaining effect.⁶

4. Empirical specification

The bargaining model provides the basis for the reduced form empirical specifications. The log linear transformation of the derived collective consumption demand function yields:

$$\ln D_j = \beta_0 + \beta_1 \ln(W^w + W^h) + \beta_2 \ln Y^{nl} + \theta \ln \mu(Y^{nl}, W^h, W^w, z) \quad (4)$$

where θ is a vector of parameters that captures the effect of the various bargaining variables. The leisure demand function can be derived following the same procedure. A suitable functional form that simplifies the complicated relationship between woman's bargaining power and the identity of the household income sources and other distributional factors are modelled following Fafchamps and Quisumbing (2006).

$$\mu(Y^{nl}, W^h, W^w, z) = 0.5 e^{(z_w - z_h) + \ln(W^w - W^{wh}) + \ln(Y^{nlw} - Y^{nlh}) + z} \quad (5)$$

⁶ The income and substitution effect constitutes the price effect as given by the Slutsky equation.

Where $(W^w - W^h)$ is spouses earned income gap, $(Y^{nlw} - Y^{nlh})$ is the spouses unearned income gap and $(Z^w - Z^h)$ denotes other distributional factors such as women's attitude towards gender equitable norms, self-confidence, education and age differences between the husband and wife. Substituting equation (5) in to (4) yields:

$$\ln Dj = \beta_0 + \beta_1 \ln(W^w + W^h) + \beta_2 \ln Y^{nl} + \theta((Zh - Zw) + \ln(W^h - W^w) + \ln(Y^{nl} - Y^{nl})) \quad (6)$$

The consumption demand function is derived under the Pareto efficiency assumption. In case this assumption does not hold in practice, we include controls for such behavioral effects. Moreover, we also control for household and village specific variables. Consequently, by augmenting model (6) with the vector of sociodemographic factors, the regression function is

$$\ln Dj = \beta_0 + \beta_1 \ln(W^w + W^h) + \beta_2 \ln Y^{nl} + \theta((Zh - Zw) + \ln(W^h - W^w) + \ln(Y^{nl} - Y^{nl})) + \pi_k^p H_k + \varepsilon \quad (7)$$

where ε is the error term and H_k denotes the vector of socio-cultural factors, demographics, household and individual specific characteristics.⁷ To estimate the consumption welfare effect of the job, compared with the controls, we add a job dummy.

However, in the case of selection effects at the hiring stage, then we need to drop some of the consumption correlates that directly impacts the probability of being selected for the job. The omission of such "bad controls" might in turn cause omitted variable bias, which we attempt to handle through instrument variables. More importantly, the regression estimate of the coefficient of the job dummy in the single equation model might be biased and inconsistent due to selection effects. Typically, the firms might hire only high ability types that are more productive, and this is unobservable. Such challenges to causal inference may be solved by instrumental variables, but requires good instruments that create an exogenous link from the job participation to household demand.

To this end, we casted the manager's decision to hire or not in terms of the underlying latent regression

$$F^* = X\psi + S\omega + \nu \quad (8)$$

⁷ Household composition, the structure of the household, age and education level (literacy) of the husband and wife, marital status, ethnicity, religion, migration status, birth place (region dummy), attitude towards male dominance and family background of the woman respondent (parent's asset ownership and education).

where F^* denotes the expected net benefit of the farm from choosing the worker, X denotes all characteristics that directly impact consumption welfare, $(X\psi + S\omega)$ denotes the index function, S denotes the vector of the additional exclusive variables that directly impacts the workers likelihood of being selected by the farm manager but impacts consumption welfare only through its impact on the hiring process. Examples of such variables includes (i) women information source regarding job availability at the flower-farm and (ii) distance from women's home to the flower farm ; ψ and ω denotes the associated vector of parameter to be estimated; and v is the error term.

The employer latent benefit from hiring the women, F^* , is unobservable, we only observe whether the women is selected for the job or not. That is,

$$F = 1 \text{ if } F^* > 0 \text{ and } F = 0 \text{ if } F^* \leq 0 \quad (9)$$

The consumption demand function can then be rewritten in the following general form for the women applicant (or their household) who were hired by the farm

$$Y_1 = \alpha_1 + Xi\beta_1 + \varepsilon_1 \quad (10)$$

where Y_1 denotes household welfare indicators, in the present case consumption demand for the flower job participant, X denotes the vector of all conditioning variables consistent with model (equation 4) and β_1 denotes the vector of parameters to be estimated for the flower participation regime. Similarly, the consumption demand function can be rewritten in the following general form for the women applicants (or their household) who were not hired by the farm

$$Y_0 = X\beta_0 + \varepsilon_0 \quad (11)$$

where Y_0 denotes household welfare indicators and β_0 denotes the vector of parameters to be estimated for the control regime and ε_0 is the associated disturbance term. The consumption welfare function for any household can then be defined in the following general functional form:

$$Y = (1 - F) * Y_0 + F * Y_1 \quad (12)$$

So, for those who got a job, Y_1 is observed, but not Y_0 , while the opposite is true for those who did not get a job (observes Y_0 but not Y_1). The endogenous switching model is then defined and can be estimated by the special maximum likelihood estimator.

5. Data and descriptive statistics

We use a household survey purposively designed for assessing the intrahousehold welfare effects of the commercial farm jobs with data from a random sample of 664 households with women workers and a control group of 182 households where a women had sought, but not got, such a job. Initially, we applied a three stage sampling method. First, we selected two of the flower areas with the highest number of flower farms, and second, 25 farms were randomly selected from a list of all such farms in those areas.⁸ At the third stage, women workers were randomly selected from the list of those living with a husband or partner, and 664 were then interviewed in 2013.

We asked the respondents to name two of their friends who were seeking a job together with them at that time, but for whatever reason did not end up with a job.⁹ The respondents were further probed to nominate only friends who were comparable with themselves in terms of age, birthplace, education and initial economic and occupational status. This resulted in 455 nominated women and we randomly selected 182 of them to serve as the control group.

Nevertheless, this type of comparison groups may not control for any selection bias at the hiring stage, for example if the control women were rejected a job because the farm management discovered that they were low-productivity types. However, our qualitative work suggested that the hiring of women workers was perceived to be random by all involved parties. In the survey, 93 percent of those who got a job stated that the hiring was random. Nevertheless, we address possible selection biases through a careful econometric approach elaborated below.

The survey instrument comprises household demographics, expenditure, income, asset, social participation and attitude, decision-making, domestic responsibilities, time use and food insecurity and

⁸ One are is in Adaa, which is located in Debre Zeit (East of Addis Ababa), the other is in Walmera, which is located in Holeta (West of Addis Ababa). We selected 13 farms from Walmera and 12 farms from Adaa.

⁹ To maximize comparability, we excluded women who never applied to work at flower farm from the sampling frame of the control group. The inclusion of such women could lead to self-section bias if more productive women seek jobs and less productive do not. Hence, the observed outcome of women who never applied for a job position would not be a good counterfactual for the working women.

hunger perception modules.¹⁰ The food insecurity and hunger module was adopted from the USDA food security core-module questionnaire but customized to fit the local context.¹¹

In order to supplement the analysis and inquire deeper into the mechanisms through which the welfare changes had been transmitted, we randomly selected half of the sample and invited them and their husbands to focus group discussions. A semi-structured open-ended questionnaire set the frame for the discussions and we coded and summarized the responses from the open-ended questions (see Villanger, Getahun and Solomon 2015 for details).

Most of the treatment women were either unemployed or in precarious employment before they got the rose farm job (Figure 1). In addition, 92% of the workers had never had a formal job before they started to work at the farm. More than three fifth of the flower workers had never participated in any income generating activities at all, and about a fifth of them were engaged only in small informal microbusiness.¹²

Figure 1. Previous occupation of the treatment women.

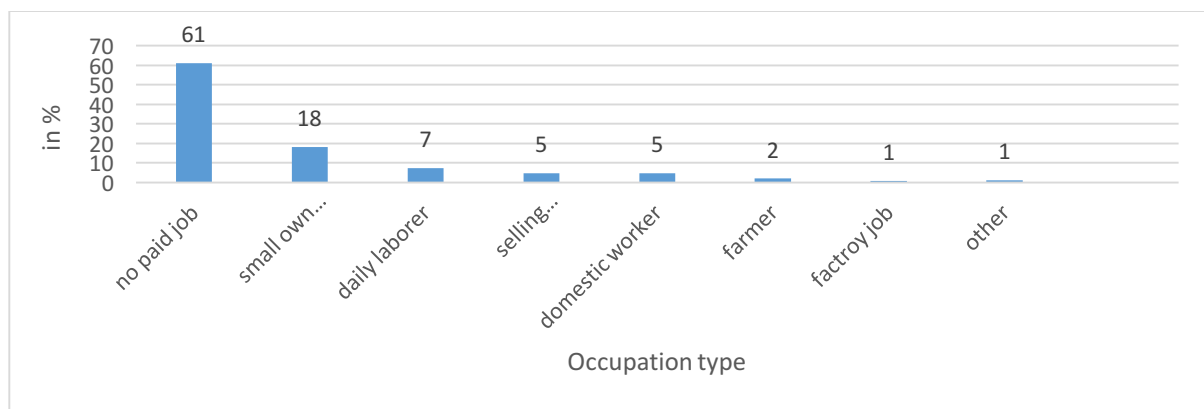


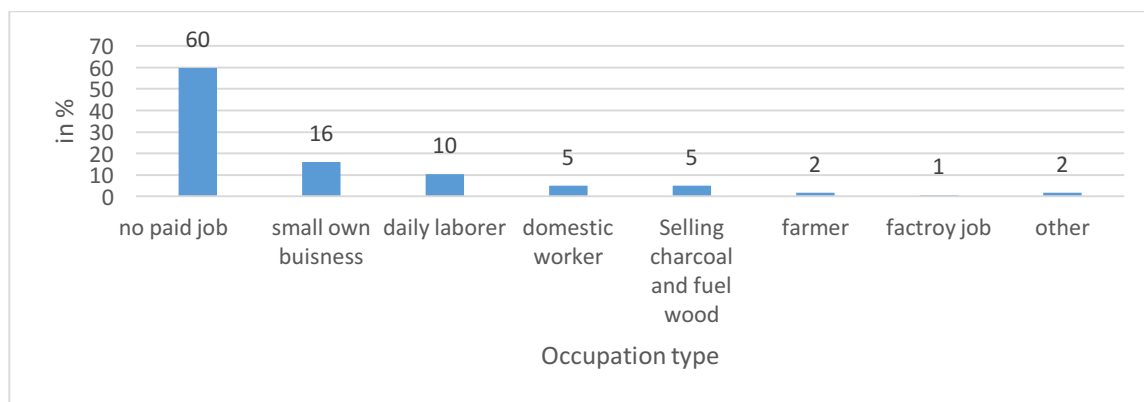
Figure 2 shows that the distribution of previous occupation of the control women has the same pattern. There are no statistically significant differences between the two groups in terms of their initial employment status and occupation type before they sought a job at the farm.

¹⁰ The questionnaire also included retrospective questions. The use of retrospective questions could introduce recall bias, but this should be similar for the treatment and controls. Moreover, given the short recall period and the fact that seeking the job at the flower farm was their first formal job search ever, we believe that the impact of recall bias is minimal. It can be possible to obtain sufficiently accurate information on the past outcomes using respondent recall for certain types of information and when there are important memory “markers” (Ravallion, 2008). We used “seeking the farm job” as such a recall memory marker.

¹¹ In the USDA core module survey instrument, food insecurity and hunger are attributed only to lack of money but in the present study it is attributed to lack of money and inadequate harvest/own production.

¹² Typically employing only themselves and selling bread/injera and traditional alcohol, hawking clothes, making and selling handicrafts.

Figure 2. Previous occupation of the control women.



Moreover, the two groups were also almost identical along most of the measured socio-demographic indicators (Table 1). The average age of the treatment and control women were not significantly different. The percentages of literate, and completed third grade and six grade, were also not significantly different across the two groups.¹³ Large majorities of both groups were married and they belonged to the same religious group. More than two-thirds of both groups were born in rural area, and the overwhelming majority of the respondents live in a nuclear family structure. The sex and age composition of their household were also comparable.

Table 1. Socio-demographic characteristics of the women

Characteristics	Control	Treatment	Difference
Can read and write	53.3	50.3	-3.0
Years of schooling completed	3.15	3.48	0.32
Completed 3 rd grade	45.05	48.49	3.44
Completed 6 th grade	29.12	31.78	2.66
Age	27.83	26.25	-1.58
Knows who is the current PM	49.45	56.92	7.47
Husband can read and write	65.56	74.58	9.02*
Husbands' age	34.94	33.12	-1.82
Married	86.81	90.77	3.96
Lives in an extended family structure	13.19	13.25	0.06
Orthodox Christian	81.32	84.64	3.32
Percentage of Oromo	86.26	75.15	-11.11*
Years of living in current place	16.16	15.91	-0.24
Born in Oromia	86.81	82.98	-3.83

¹³ Together with the employment trajectories, the age and education profiles suggests that the two groups also have a similar working experience before seeking employment.

Born in Amhara	9.14	8.13	-1.02
Born in an urban area	30.22	28.96	-1.26
Born in Walmera district	33.52	36.30	2.78
Born in Adaa	46.70	40.06	-6.64
Household size	3.76	3.29	-0.46*
Adult Equivalence Household size	2.11	1.91	-0.21*
Has children	73.62	76.34	2.72
Number of children below 5 years	0.63	0.54	-0.08
Number of young age member (6-14 years)	0.67	0.65	-0.02
Number of working age member (15-64 years)	1.03	1.08	-0.05
Had inside information about farm job	16.67	72.96	56.29***
Travel time by foot from home to farm (minutes)	97.8	77.34	-20.46***
Parents own agricultural land	76.1	84.63	8.53***
Parents own cattle (number)	4.35	4.67	0.32
Parents own pack-animals (number)	1.18	1.17	-0.01
Father's average years of schooling	1.01	1.65	0.64*

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, two sided t-test

However, the two groups were significantly different in terms of their connection to workers at the flower farm. Almost three fourths of the treatments, but less than one fifth of the controls, had heard about the vacancies from someone working inside the farm. Moreover, the controls reside significantly farther from the farm and live in slightly larger households.¹⁴ In addition, fewer controls have literate husbands and parents who own land, and their fathers also have a few months less education. However, there were no differences in terms of livestock ownership, which is a key indicator of wealth in these societies.

Table 2 presents the initial economic status of the households based on recall of their situation at the time they applied for work. The mean separation test result cannot reject the null of no statistically significant difference between two groups, except for the earned income of the husbands.

Table 2. Initial economic conditions

	Control	Treatment	Difference
Average earned income of the women (ETB)	121	115	-6
Average earned income of the husband (ETB)	749	601	-148***

¹⁴ The transport costs between the farm and the home is zero for the worker as the farms provide busses.

Average per adult equivalent income (ETB)	432	458	26
Average per adult equivalence food consumption	318	303	-15
Average per adult equivalence consumption (ETB)	445	433	-12
Poverty rate, income-based	31.9	34.0	2.1
Poverty rate, consumption-based	36.3	35.9	0.4
Food insecurity and hunger scale (USDA)	4.48	4.33	-0.15
Number of times adults eat per day	2.57	2.62	0.05
Number of times children eat per day	2.81	2.93	0.12
Days per year the household face food deficit	24	22	2
Average women's share of household income (%)	13.2	15.8	2.6
The average share of food expenditure	66.6	65.2	-1.4

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, where 1 USD = 11.8 ETB.

The similarities of the observables between the groups suggests that they are likely to be comparable also in terms of their initial unobservable characteristics, contributing to identification (Wooldridge 2009).

6. Estimation Strategy and Results

In our model, household consumption, leisure demand and selection into the job are jointly determined. Although the control group design accounts for self-selection of women deciding to search for a job, we cannot rule out that there is selection at the hiring stage. Hence, we use a switching regression model with a special maximum likelihood estimator developed by Lokshin and Sajaya (2004) and evaluate the mean causal relationships between getting a job and standard treatment parameters by sorting respondents into job and no-job regimes. Moreover, to account for the pre-job socioeconomic differences between the two groups and to separate the impact of the job from time invariant confounders, we use the two-way fixed effect model. To disentangle the agglomeration effect from time varying unobservable confounders, we also used the difference-in-difference model combined with instrumental variable estimation techniques. We show that the results are robust to econometric technique and test for job-effects in panel probit models, poisson models and binomial regression models.

6.1 Impacts on consumption

Total household consumption¹⁵ and selection bias

The simple comparison of the average difference in per adult equivalent household consumption between the treatment and control groups before and after getting the job suggested an estimated impact of 31 % (138 Birr) increase of per adult equivalent household consumption. Controlling for correlates gives almost the same estimate, a 30 % (134 Birr), and this would then be the preferred estimate if there was no selection at the hiring stage.

Our endogenous switching regression model specification is a variant of the classical Heckman selection model and can be estimated manually either by running Heckman two-step procedures twice or by the ordinary maximum likelihood estimation. However, both of these estimation methods are inefficient and require potentially cumbersome adjustments to derive consistent standard errors (Lokshin and Sajaya 2004). We therefore adopted a more efficient special maximum likelihood estimation procedure, developed by Lokshin and Sajaya (2004) for such purposes, to estimate the selection and the consumption welfare functions of the two groups of households. This estimation strategy addresses the selection bias and generates consistent standard errors since it implements the Full Information Maximum Likelihood Method (FILM) to simultaneously fit binary and continuous parts of the endogenous switching regression model. The estimator assumes that the error terms in the switching, and consumption welfare equations for both job and no-job regimes ($v_i, \varepsilon_{1i}, \varepsilon_{0i}$) have a tri-variate normal distribution with mean zero and covariance matrix

$$\Omega = \begin{pmatrix} \sigma_v^2 & \sigma_{1v} & \sigma_{0v} \\ \sigma_{1v} & \sigma_{\varepsilon_1}^2 & \cdot \\ \sigma_{0v} & \cdot & \sigma_{\varepsilon_0}^2 \end{pmatrix}$$

where σ_v^2 is a variance of the error term in the selection equation, and $\sigma_{\varepsilon_1}^2$ and $\sigma_{\varepsilon_2}^2$ are variances of the error terms $\sigma_{1v} = cov(\varepsilon_1, v)$ and $\sigma_{2v} = cov(\varepsilon_2, v)$ ¹⁶.

¹⁵ Consumption based welfare measures are favored in poor countries because (i) consumption is a key argument in household utility functions (ii) consumption decisions are more related with other household decision outcomes such as nutrition and health (Deaton 1997, Atkinson 1991, Meyer 2003), (iii) Consumption is less erratic (than income) as it captures household's access to credit and saving at times when their income is very low, and (iv) consumption data are more accurate than income. Reports of household income is likely to be understated compared to consumption expenditure reports. Expenditure on clothes and footwear can be considered as private (assignable) expenditures while the other expenditures may have benefited all household members and may hence be considered as public (household) expenditure. Moreover, an individual's leisure is another assignable good important for welfare.

¹⁶ The covariance between σ_{1v} and σ_{2v} is not defined, as Y_{1i} and Y_{0i} are never observed simultaneously.

The FIML results are reported in Table 3, where bad controls have been excluded in both of the consumption welfare equations.¹⁷ The results of the selection equation are reported in the first column while results of the consumption welfare function for the job and no-job regime are reported in the second and third column. The likelihood-ratio test for joint independence of the three equations are reported at the bottom of the table.

The selection equation results indicate that older women had a lower chance of getting the farm job. The results further suggest that the likelihood of the woman to be selected for the job had a negative relationship with the non-labor income of their household.¹⁸ The likelihood of getting the job was also negatively related with the total household size of the applicant, which corresponded to the anecdotes about farm management preferring women without children to avoid absence from work due to child-related issues.¹⁹ Interestingly, the vector of the additional exclusive restrictions (instrumental variables) in the selection equation are significant even at 1% level of significance reflecting the relevance of the instruments. The coefficient of the information dummy is positive and significant suggesting that women applicants who got information about the job opportunity from someone working inside the flower farm had a significantly better chance of being selected for the job. Similarly, the coefficient of the farm distance variable is significant and negative indicating that women who resided closer to the farm had a better chance of getting the job.

Table 3. The FIML estimates of selection and household consumption

	Selection equation		Consumption welfare equation			
			Treatment		Control	
	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.
Log of real husband labor income	-0.232	(0.13)	0.159***	(0.02)	0.463***	(0.08)
Log of real non-labor income	-0.088*	(0.03)	0.049***	(0.01)	0.082***	(0.01)
Employment Duration	0.038	(0.03)	0.003	(0.01)	-0.007	(0.02)
Women age	-0.208*	(0.09)	-0.061	(0.05)	-0.159	(0.12)
The square of women age	0.003*	(0.00)	-0.255***	(0.05)	-0.279**	(0.10)
Husband Age	-0.040	(0.06)	-0.030	(0.02)	-0.050	(0.06)
The square of Husband age	0.000	(0.00)	0.000	(0.00)	0.000	(0.00)
Women Age# Literate	-0.007	(0.01)	0.000	(0.00)	-0.000	(0.00)

¹⁷ Bad controls are women's wages, spouses' earning gap, women's self-confidence, gender attitudes and embeddedness to social network after they applied for the job, since getting a directly impacts these variables. In causal analysis, only variables that are not directly impacted by the treatment variable should be included. That is, variables that directly impacted by the treatment assignment are bad controls and hence must be excluded in the consumption welfare equations (Wooldridge 2009, Angrist and Pischke 2009).

¹⁸ Higher non-labor income may raise the women's reservation wage and may encourages them to leave the job and seek for better opportunities (see Deaton 1987). If this is anticipated by the farm management, they may select, ceteris paribus, women with lower non-labor income.

¹⁹ For example, if the child becomes ill, the women may have to take care of it herself.

Women age # 6 th grade completed	0.004	(0.01)	-0.000	(0.00)	-0.001	(0.00)
Husband Age# literate	0.007	(0.01)	-0.001	(0.00)	0.001	(0.00)
Dummy for Orthodox religion	-0.138	(0.21)	0.006**	(0.00)	-0.003	(0.00)
Dummy for urban born	0.015	(0.17)	-0.000	(0.00)	-0.000	(0.00)
Dummy for Oromo ethnicity	-0.602**	(0.21)	-0.102	(0.10)	-0.080	(0.15)
Dummy for married women	-0.315	(0.23)	0.076	(0.06)	-0.028	(0.10)
Adult equivalent household size	-1.743**	(0.66)	-0.118*	(0.05)	-0.002	(0.08)
Spouse education Gap	-0.084	(0.33)	-0.085	(0.08)	-0.035	(0.12)
Dummy for parental land holding	0.379*	(0.17)	-0.046	(0.07)	0.089	(0.07)
Distance from home to farm	-0.005***	(0.00)				
Dummy for inside information	1.448**	(0.16)				
Number of children below age five	0.453	(0.24)				
Number of young age member	0.642**	(0.22)				
Number of working age member	1.091**	(0.33)				
Constant	8.300***	(1.75)	6.406***	(0.33)	3.950***	(1.01)

Note: The dependent variable in the selection equation is a dummy variable indicating whether the women got the job, the dependent variable in the job and no-job welfare equations is log of real per adult equivalents consumption. The special maximum likelihood estimator using the movestay command is adopted. Literate implies the ability to read and write. Spouse education gap implies that the husband can read and write but not the wife.

Once we control for the effect of total household size, the coefficient of the size of the working age members is significant and positive which suggest that the probability of getting the job is increasing with the total number of working age members of the household. This could be because households with more working age members may have a better chance of knowing flower workers or managers, who can alert them whenever the farm is hiring. The result further indicate that mothers with older children (age 6 to 14 years) had a better chance of being selected for the job than mothers with younger children (age 0 to 5 years). The various education dummies interacted with the age of the male and female head of the household are insignificant in the selection equation. The farms did not have any requirements with respect to educational level in the recruitment of production workers as most of the activities at the production level are not skill intensive. This was also reflected in the low educational achievement of the sample women (Table 1), and strengthens the argument of a large degree of randomness in hiring of workers.

The FIML estimates of the two consumption welfare functions suggest that the effect of husbands' earning and the household non-labor income, both in real terms, are highly significant and positive. The husbands' earnings was more important for the control households. For example, a doubling of husbands' real wage would increase the real per adult consumption of the control households by 46 percent but the treatment household by only 16 percent. Hence, the wife's income is much more important to household income in the treatment as compared to control households.

Based on the FIML estimates of the parameters of the selection and the two consumption functions, we computed the average causal impact of flower job participation through the evaluation of the standard treatment parameters. As indicated in the strand of treatment evaluation literatures such Heckman (2004) and Wooldridge (2009), average treatment effect (ATE) and average treatment effect on the treated group (ATET) is statistically defined as:

$$ATE = E(Y_1 - Y_0 | X) = E(Y_1 | X) - E(Y_0 | X) = X\beta_1 - X\beta_0 \quad (5.1)$$

$$ATET = E(Y_1 - Y_0 | X, F=1) = X\beta_1 - X\beta_0 + E(\varepsilon_{1i} - \varepsilon_{10} / v_i \geq -(X\psi + S\omega)) \quad (5.2)$$

$$\text{where } E(Y_1 | X, F=1) = X\beta_1 + \sigma_{1v}IMR \text{ and } E(Y_0 | X, F=0) = X\beta_0 - \sigma_{0v}NSHR \quad (5.3)$$

and IMR and NSHR stands for inverse mills ratio and non-selection hazard rate²⁰.

Table 4 presents the computed expected actual and counterfactual outcomes and the associated Average Treatment Effect (ATE) and Average Treatment Effect on Treated (ATET)²¹ and suggests that getting the job increased the real per adult equivalent consumption of the working women's household by 25% (ETB 172) before controlling for initial conditions.

Table 4. The Computed ATE and ATET values based on the consumption function estimates

	n	Average real per adult equivalent consumption	S.e.	95% confidence interval	
E(Y1i/Xi)	672	650	6.705	637	663
E(Y0i/Xi)	672	504	8.328	487	520
ATE	672	146	4.507	137	155
E(Y1i/Xi, F=1)	524	663	8.077	647	679
E(Y0i/xi, F=1)	524	490	9.299	472	509
ATET	524	172	5.106	162	182

To account for potential initial socioeconomic differences between the treatment and control group as well as to tidy up the employment impact from time invariant heterogeneities, we use two way fixed effect (FE) model. Table 5 shows the results together with the DID model with covariates. The two estimates are qualitatively comparable and suggest that getting the job increased the real per adult

²⁰ The OLS estimation of the two consumption welfare functions yields inconsistent and biased estimate due to the omission of *IMR* & *NSHR*, which both are a function of X.

²¹ The conditional and unconditional expected actual and counterfactual real per adult equivalent consumptions of the two groups of the household are computed by executing the “mspredict” command after executing the “movestay” special command, the syntax of both commands are installed in Stata by Lokshin and Sajaya (2004).

equivalent consumption of the household by about a third compared with the control group. However, there may also be time varying heterogeneities that differs between the groups due to selection effects. In that case, these results may be interpreted as the combined effect of getting the job and time varying unobservable cofounders. To control for such heterogeneity, we instrument and apply the difference-in-difference estimator combined with (i) General Method of Moment (DID_GMM) and (ii) three stage least square (DID_3SLS), see Table 5.

The key challenge is to have identifying variables that affect household consumption welfare solely through their impact on female employment. To create an exogenous link between female flower farm employment and wellbeing we use (i) Information source dummy²² regarding job opportunity at the farm, and (ii) distance from the applicant's home to the farm since transport cost did not accrue to the worker. Being connected to someone working in a farm might increase the likelihood of the worker to be selected for the job. Women who resided closer to the farm might also have a better chance of knowing the flower farm managers, or checking for vacancies more frequently, and hence could have had a better chance of being selected for the job (see Table 5). The test of over identifying restriction is insignificant, the test of week instrument shows that the instruments are valid and strong and the minimum Eigen value test also supports the validity of the two instruments (see Annex 1b for details). Despite all the claims that selection at the hiring stage is random, the tests of endogeneity rejects the hypothesis.²³

Table 5. Consumption estimates

	(DID)	(FE)	(DID_GMM)	(DID-3SLS)
	Ln(Real per adult consumption)	Ln(Real per adult consumption)	Dln(Real per adult consumption)	Dln(real per adult consumption)
Time	-0.14** (-2.59)	0.23*** (5.38)		
Group	0.01 (0.14)		0.27*** (3.31)	0.31*** (3.99)
Participant # Post	0.30*** (4.53)	0.37*** (9.63)		
Employment duration	0.06*** (8.04)	0.00 (.)	-0.15*** (-16.48)	-0.14*** (-16.35)
Ln(real husband Earning)	0.22*** (10.24)	0.08*** (4.27)		
Ln(real non-labor income)	0.08*** (10.32)	0.03*** (4.46)		

²² A value of 1 is assigned to this dummy if the women got information about vacancies from someone working in the farm.

²³ GMM C statistic chi2 (1) = 0.115.

Adult equivalent household size	-0.25*** (-6.98)	-0.39*** (-6.07)	-0.09* (-2.32)	-0.09* (-2.25)
Women age	-0.02 (-1.36)	-0.11*** (-7.50)	-0.01 (-0.49)	-0.01 (-0.71)
The square of women age	0.00 (0.76)	-0.00** (-2.97)	-0.00 (-0.22)	0.00 (0.09)
Husband age	0.00 (0.42)	0.00 (.)	0.03 (1.90)	0.03* (2.11)
The square of husband age	-0.00 (-0.01)	0.00 (1.75)	-0.00 (-0.92)	-0.00 (-0.90)
Women age # Literate	-0.00 (-0.50)	-0.01 (-1.40)	0.00 (1.54)	0.01* (2.13)
Women age #3 rd grade completed	-0.00 (-0.16)	0.00 (0.06)		-0.00 (-1.68)
Woman age # 6 th grade completed	0.01** (3.25)	0.00 (0.34)	0.00 (0.32)	0.00 (0.88)
Husband age # Literate	-0.00 (-0.83)	0.01 (1.59)	-0.00 (-0.81)	-0.00 (-0.89)
Spouse Education Gap	-0.12	0.00	0.10	0.12
Dummy for married women	-0.02 (-0.50)	-0.16* (-2.20)	-0.15** (-2.64)	-0.13 (-1.90)
Dummy for Urban born women	-0.09* (-2.39)	0.00 (.)	-0.01 (-0.21)	-0.03 (-0.63)
Dummy for Orthodox religion	0.02 (0.47)	0.00 (.)	-0.00 (-0.01)	0.00 (0.04)
Dummy for Oromo ethnic group	-0.03 (-0.72)	0.00 (.)	-0.05 (-0.99)	-0.05 (-1.04)
Dummy for parental land holding	-0.02(-0.56)			
N	1247	1409	512	512

The IV estimation produce similar results. The impact of getting a job increased the real per adult equivalent consumption by 27 % (DID_GMM) and 31% (DID-3SLS) compared with the control group.²⁴ In sum, all estimation techniques arrive at the same conclusion; the impact of getting a job in the flower farms had large positive impacts on household consumption, and the increase is in the range between 25 % and 33 %. Moreover, there seems not to be strong effects of selection at the hiring stage on the consumption impacts estimates.

Poverty

We define the poverty line based on the cost of 2,200 kcal per day per adult food consumption, with an allowance for essential non-food expenditure.²⁵ To calculate the poverty indices, the real per adult

²⁴ In the DID-3SLS model, consumption growth, job participation and the two earning functions were simultaneously determined. The full estimation results of the DID-3SLS model are reported in annex 1a.

²⁵ This is the minimum energy requirement for a person to lead a “normal” physical life under Ethiopian conditions.

equivalent consumption are first computed by deflating the nominal values of per adult equivalent consumption by the spatial price indices (disaggregated at regional level relative to national average prices) and temporal price indices (relative to 2005/6 constant prices). Second, the 2005/6 poverty line is computed at 2010/11 prices.²⁶ We then computed the incidence and depth of poverty following the standard Foster, Greer and Thorbecke (1984) approach:-

$$P_{\alpha} = \frac{1}{N} \sum_1^q \left(\frac{Z - y_i}{Z} \right)^{\alpha}$$

Where Z is poverty line, y_i is real per adult equivalence consumption expenditure sorted in ascending order, N is the total number of households and q is the number of poor household and P_{α} is Foster, Greer and Thorbecke class of poverty indices and α is the inequality aversion parameter ($\alpha \geq 0$), which reflects the policymaker's degree of aversion to inequality among the poor. For $\alpha=0$, we have the poverty incidence, while for $\alpha=1$ we have the poverty depth index reflecting how far, on average, individuals fall below the poverty line. Table 6 suggests that getting the job causes large reductions in household poverty.

Table 6. The impact on poverty

	Poverty Incidence		Food Poverty		Depth of Poverty	
	Coef.	se	Coef.	se	Coef.	se
Time	0.28*	(2.07)	-0.35*	(-2.55)	0.09	(0.47)
Group	-0.06	(-0.48)	0.03	(0.22)	0.21	(1.04)
Job	-0.61***	(-4.02)	-0.81***	(-4.98)	-0.37+	(-1.62)
Log of husband earning	-0.42***	(-9.35)	-0.26***	(-6.97)	-0.13**	(-2.62)
Log of Non-labor income	-0.16***	(-8.39)	-0.11***	(-5.34)	-0.05	(-1.72)
Adult Equivalent household size	0.62***	(6.91)	0.48***	(4.52)	0.19	(1.46)
Household head age	-0.03	(-1.19)	-0.01	(-0.36)	0.02	(0.48)
Square of head Age	0.00	(0.77)	0.00	(0.87)	0.00	(0.02)
Spouse age gap	-0.01	(-0.23)	-0.03	(-0.75)	-0.03	(-0.58)
Square of spouse age gap	0.00	(0.31)	0.00	(0.66)	0.00	(0.26)
Woman age # Literate	0.00	(0.27)	0.01	(1.47)	0.00	(0.52)
Woman age #3 rd grade complete	0.00	(0.10)	-0.00	(-0.42)	-0.00	(-0.56)
Woman age #6 th grade complete	-0.01**	(-2.64)	-0.00	(-0.64)	-0.00	(-0.53)
Husband age # Literate	0.00	(0.93)	0.00	(0.13)	-0.00	(-0.15)
Spouse Education gap	0.18	(1.02)	0.35	(1.64)	0.06	(0.21)
Married women dummy	-0.15	(-0.97)	-0.35	(-1.51)	0.01	(0.05)
Urban born dummy	0.11	(1.24)	-0.01	(-0.08)	0.08	(0.55)
Orthodox religion dummy	-0.28*	(-2.51)	-0.44***	(-3.47)	-0.19	(-1.17)
Oromo ethnicity dummy	0.05	(0.50)	0.12	(0.86)	0.07	(0.39)
<i>N</i>	1427		1427		551	

Note: Marginal effects; *t* statistics in parentheses; (d) for discrete change of dummy variable from 0 to 1; *p<0.1,

²⁶ The food and absolute poverty lines for 2010/11 are determined by the Ethiopian national poverty lines of ETB 1985 and ETB 3781, respectively (MOFED 2012).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; # refers interaction, the consumption dimension of poverty is used. Spouse education gap implies husband can read and write but not the wife

The coefficient of the impact variable, (*Job*, the interaction of the group identifying and post flower job time dummy) is significant and negative for all the poverty measures. The coefficient of the time dummy is positive and significant in the poverty incidence function reflecting the counterfactual outcome of increasing poverty incidence.²⁷ This suggests that getting the job protected many households from falling in to poverty. Interestingly, the coefficient of the group identifying dummy is insignificant in all of the three poverty functions suggesting no significance difference between the two groups of women before they applied for the job. This strengthens the causal interpretation.

Food Insecurity and Hunger Status

To assess likely impacts on the food insecurity and hunger status, we use both a quantitative indicator (per adult equivalent consumption expenditure) and a qualitative indicator (food insecurity and hunger scale). We use the same estimation strategies as for household consumption, above (see Annex 2). The diff-in-diff and two-way fixed effect estimates suggest that getting the job increased the real per adult equivalent household food consumption by 42 % and 46 % respectively. Controlling for time varying heterogeneities yields similar results (Table 7).

Table 7. Impact on Food Consumption

	(DID)	(FE)	(DID GMM)	(DID 3SLS)
	Ln of real per adult food consumption	Ln of real per adult food consumption	DLn(real per adult food consumption)	DLn(real per adult consumption)
Time	0.23*** (0.06)	-0.01 (0.04)		
Group	-0.01 (0.05)		0.41*** (0.09)	0.46*** (0.09)
Job	0.42*** (0.07)	0.46*** (0.04)		
Control Variable	Yes	Yes	Yes	Yes
<i>N</i>	1248	1410	513	513
adj. <i>R</i> ²	0.427	0.575	0.123	

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, the dependent variable is log or log difference of real per adult equivalent consumption expenditure. **relevant covariates as well as the husband and wife wage equation are not reported. The full estimation equation is available upon request. DLn refers log difference.

²⁷ This could be attributed to the hyperinflation in the period.

The consumption measures may not provide the full picture about food security and hunger status of the household (USDA, 2000). We therefore complement this with a qualitative composite food insecurity and hunger index analysis. The index captures the varied degree of the severity of food insecurity and hunger and is expressed by numerical values ranging from 0 to 10, where “0” denotes the condition of fully secure, i.e. a household that has not experienced any of the conditions of food insecurity and “10” represents the most severe condition, i.e. a household that has experienced all of the conditions of the food insecurity and hunger (see USDA, 2000). Table 8 shows that the all impact estimates are similar and suggesting that getting a job helped to reduce the severity of food insecurity and hunger.

Table 8. Impact on Food Insecurity and Hunger scale-Continuous

	(DID)	(FE)	(DID_GMM)	(DID_3SLS)
	FSH	FSH	D(FSF)	D(FSH)
Time	0.24 (0.24)	0.25 (0.21)		
Group	-0.10 (0.20)		-1.91*** (0.43)	-1.75*** (0.41)
Participant #post	-1.43*** (0.26)	-1.28*** (0.20)		
Control variable	Yes	Yes	Yes	Yes
<i>N</i>	1265	1427	530	530

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.00$, In the DID and FE models the dependent variable is in levels while in the DID_GMM and DID_3SLS models the dependent variable is in first difference of the Food Insecurity and Hunger (FSH) scale. *Relevant covariates as well as the husband’s and wife’s wage equation is not reported. The full estimation equation is available upon request’s stands for the continuous food insecurity and hunger scale, and D (FSH) implies the first difference of FSH.*

Intrahousehold distribution of welfare

In Ethiopia the single most exclusively assignable and recordable expenditure are expenditures on clothing and footwear. The average annual expenditure on children, men’s and women’s clothing and shoes for the two groups of households, a year preceding the survey period, are reported in Table 9. The mean comparison test reported in the last column indicates a statistically significant mean difference in terms of such expenditures between the women who got the job and those who did not, as well as between the household members of the two groups. Table 9 also shows that getting a job benefited both spouses in terms of assignable goods. Similarly, expenditure on children’s assignable private goods is also higher in households where the women got the job than in the control households.

Table 9. Annual expenditure on clothing, cloth, tailoring and footwear (Birr), 2013

	Control	Treatment	Mean difference

Expenditure on wife's cloths and shoes	168	372	204***
Expenditure on husband's cloths and shoes	323	582	259***
Expenditure on children's cloths and shoes	332	472	140***

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, 1 USD=1178 ETB in 2009

Moreover, leisure time is often neglected as a dimension of wellbeing, despite its potential importance and unique private goods character.²⁸ In line with our above model, the determinants of the leisure demand function at the individual level and getting the job are jointly estimated using the full information and the maximum likelihood estimator (reported in Annex 3a-d). Based on the estimated parameters of the respective leisure demand functions, we computed the average impact of the job on the leisure demand by of household members (Table 10). The estimation results suggest that getting the job significantly reduced the leisure demand of the women and their oldest daughter and husband. The negative impact on the working women's leisure demand was much larger than for the other household members, and the impact was larger for the oldest daughter as compared to the husbands'. So even if getting the job resulted in improved the material wellbeing for the household, it erodes their time for leisure. The result further unveils that getting the job impacts the welfare of the oldest son positively not only through consumption but also through increased leisure demand, something that is consistent with the findings of Ilahi (1999) and Doss (2011).

Table 10. Impact on Intrahousehold Leisure Time Allocation, 2013

	Wives		Husbands		Oldest daughter		Oldest son	
	Mean	Se	Mean	se	Mean	Se	Mean	Se
$E(Y1i/Xi, F=1)$	38	(0.50)	78	(0.75)	118	(1.86)	126	(1.57)
$E(Y0i/xi, F=1)$	91	(1.06)	82	(1.06)	125	(1.37)	117	(2.32)
ATET	-53	(1.12)	-4	(1.14)	-7	(2.29)	9	(2.46)
N	524		524		524		524	

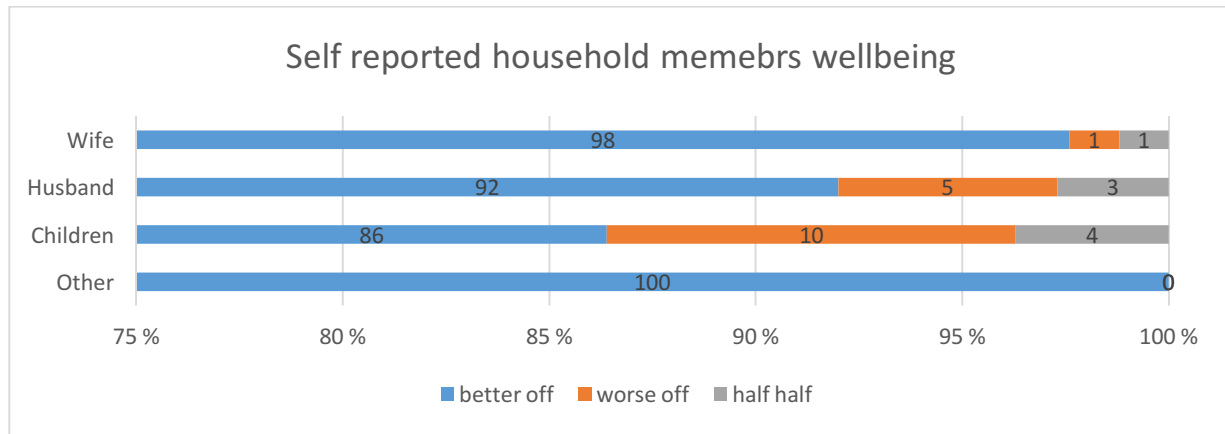
Note: Leisure demand is measured in terms of number of monthly leisure hours. The expected leisure hours of the wives, husbands and their children are computed based on the FML estimates of the leisure demand functions.

We also conducted focus group discussions (FGDs) with half of the sampled women who got the job, and their spouse, in order to get their own views of the individual impacts on welfare (see Villanger, Getahun and Solomon 2015 for details). The discussions started by elaborating on how quality of life was before

²⁸ Leisure demand is an argument in most household utility (welfare) functions, see our model above. According to Chiappori (1988, 1992), Bourguignon and Chiappori (1992), and Browning et al. (1994) and Fafchamps (2006) leisure time is the most exclusively assignable resource for the poor.

the women got the job in terms of material and economic wellbeing and how they spent their time. Subsequently, they were directed towards how their lives had changed as a result of woman getting the job. The responses confirm the results of the econometric analysis (Figure 3).

Figure 3. Focus group discussions. Share of groups concluding on individual welfare changes.



The vast majority of the FGD participant claimed that the job had improved the material wellbeing of all individuals in the household, despite leading to a significant increase in the work burden. The women themselves described improvement in their own wellbeing as being able to afford to buy enough food; buying clothes for themselves, be able to save money and to be able to cover their personal expenses from their own earning and able to take care of themselves. Equally important aspects described by the women are sense of economic independence, self-confidence, feeling of satisfaction, sense of self-worth and ability to make decisions on own income. Most husbands were also pleased about their wives' job, mostly because this had helped them to meet their household's consumption demand. Most of the husbands and wives also stated that their children's wellbeing was improved as a result of getting the job. The most common benefits mentioned were the ability to provide more and better food and clothing as well as to afford school expenses. The majority of the husbands and wives group also stated that the wellbeing of other family members who are not part of the core family (the "other" group) was also improved.

Although the majority of the FGD participants gave strong statements about the positive impact on wellbeing from getting the job, a few participants also disclosed some of the adverse effects. The concerns raised included the hard physical work, direct exposure to dangerous chemicals and risk of incurring costly health services and the pressure and time-constraints to cope with domestic responsibilities. Some women had also experienced strain and backache due to long hour bending in harvesting and swollen feet due to long hours of standing in the greenhouse. A few husbands also stressed

the intangible costs of their wives employment at the flower farm, in addition to the negative issues mentioned above. A small but significant minority of husbands concluded that the impact of their wives' job had been negative to their own wellbeing for the same reasons as given above. Some of these labeled the flower farm employment as a distress sale of labor.

6.2 Transmission Mechanisms: Drivers of Welfare Changes

According to our theoretical model, the job could impact the consumption welfare of the women and individual household members through its income, substitution and bargaining effects. Here we test the relevance of each of these channels.

Income effects

First we assess the first order effect of the job on income.²⁹ Table 11 reports the mean values of the various sources of household income, both before and after the treatment and control women sought the jobs. The diff-in-diff estimates suggest that the job had positive impacts on the earnings of the women, while it negatively impacted household income from other sources. Getting the job increased the wage income of the treatment women by more than 266 percent (ETB 322) on average, compared with the change for control women. Nevertheless, the effect on remittances was negative; the job caused a decrease in received remittances by 214 percent (ETB 45) compared with the control household. Similarly, income from the sale of agricultural produce decreased by 76 percent (ETB 108) likely because the job crowds out women's time to spend on farming activities. The treatment women were away from home for more than nine hours a day and six to seven days a week, so income from home based non-farm business also decreased significantly.³⁰ The net income effect of women's industrial employment is positive and large.

Table 11. Impacts on income, by income source

Monthly income (in Birr)	Before		After		Diff-in- diff
	Control	Treatment	Control	Treatment	
Agriculture	142	152	192	94	-108***
Non-farm own business	159	134	156	70	-61*

²⁹ Women wage, spouses earning gap, women self-confidence, gender equitable attitude and embeddedness to social network were excluded in the impact estimation models because getting the job impacted consumption and leisure demand by directly affecting these variables.

³⁰ These businesses typically involved making and selling bread, injera, and drinks, and handicrafts and pottery.

Flower job	15	69	52	699	593***
Other hired work	579	409	781	583	28
Remittances	21	28	51	13	-45***
Women's earnings	121	115	296	612	322**
Real household income	479	430	304	363	108***

Note * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

When estimating the income effect of female flower job employment by two way fixed effect/DID estimator using heteroskedasticity-robust estimator of the VCE of the least square estimator, we see that the results do not change a lot (Table 12). The coefficient of the impact variable (the interaction of the time and group identifying dummy) is highly significant and positive in the women's earning and total household income function. The magnitudes suggests that getting the job increases the average real wage of the women by almost 200 percent and their households' average real income by 50 percent over the four years period. Again, the coefficients of the impact dummy in the non-labor income (remittance) function is negative but only marginally significant. The coefficient of the group dummy in the women's earning function is insignificant indicating that the two groups were earning similar income before applying for the job.³¹

Table 12. DID estimation: effect of job on wage and non-wage income

	Log of women real wage	Log of real non-labor income	Log of real household income
Time	1.13*** (0.24)	-0.41 (0.26)	-0.32*** (0.07)
Group	-0.06 (0.20)	-0.23 (0.22)	-0.35*** (0.06)
Job #Post	1.86*** (0.25)	-0.40 (0.29)	0.51*** (0.07)
Impact duration	0.03 (0.02)	0.08** (0.03)	0.07*** (0.01)
Woman age	0.12*** (0.03)		
The square of woman age	-0.00*** (0.00)		

³¹ The coefficient of experience (age) in both of the earning functions are statistically significant and positive. The impact of education in the wife's and husband's earning function is positive as expected but not statistically significant at 0.05 level, probably because in rural settings the returns to education through unskilled employment are not substantial.

Woman years of schooling	-0.05 (0.04)
Women complete 3 rd grade	0.15 (0.21)
Women complete 6 th grade	0.13 (0.22)
Women read and write	0.01 (0.16)

<i>N</i>	1688	1513	1675
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Note: *t* statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. **Time** is a dummy taking a value of 1 for post flower job participation period; **Group** is a dummy taking 1 for flower job participating women

Bargaining power

Since there are no direct measures of bargaining power, we use a wide range of quantitative indicators such as spouses earning difference and qualitative indicators such as women’s gender equitable attitude, social network and self-confidence to assess the effect of getting a job on intrahousehold bargaining. Table 13 shows that the impact of the job on the spouses’ earnings gap is large and negative – almost closing the gap. The reduction in the spouses earning gap is likely to represent an improvement in the relative intrahousehold bargaining power of the women through the creation of an improved outside option, which in turn is likely to affect the intrahousehold welfare allocation documented above (see for example Aizer 2010 and Browning, Chiappori and Weiss 2011).

Table 13. Intrahousehold earnings differences

	Before		After		Diff-in-diff
	Control	Treatment	Control	Treatment	
Women’s share of household earnings (%)	13	16	24	45	18**
Spouses’ earnings difference (Birr)	624	480	620	253	-223**

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Moreover, to investigate whether the job influenced the gender attitudes, the women were asked if they agree or disagree with five gendered statements (Table 14). We see that the average score for the treatment women is significantly higher than for the controls implying that the job changed the attitudes towards a higher degree of gender equality. This could in turn influence intrahousehold bargaining and the allocation of resources.

Table 14. Gender attitudes among women

Gender Attitude	Control	Treatment	Diff.
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Women should subject to traditional law/ should not treat like a men	74	98	24***
A husband has the right to beat his wife if she misbehave	57	92	35***
The important decisions of the family should be made by the men of the family only	66	91	25***
A wife should tolerate being beaten by her husband to keep the family together	57	75	18**
It is better to send a son to school than it is to send a daughter	61	96	35
Average Gender Equitable Score	3.1	4.5	1.4***

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, In all the five statements “agree” implies gender inequitable attitude.

We also looked into how the job influenced the self-confidence of the women. Table 15 shows that the job made the women more independent and increased their self-reported self-confidence. Again, this may influence the allocations.

Table 15. Self-confidence: Percentage of women who agree with the following statement

	Control	Treatment	Differenc
If I wanted to leave my husband, I could support my family on my own	30	51	21***
I can achieve whatever I set my mind to in life if I just work hard enough	55	93	38***

Finally, the women were asked to indicate whether they are a member of (i) women’s prayers group (ii) social insurance group (Idir), (iii) savings group (Equib) and (iv) workers group. Table 16 shows that the average social network score of treatment women is significantly higher than the controls again suggesting a positive impact of network formation from getting the job.³²

Table 16. Percentage of member women and average social capital score

	Women’s Prayer group (%)	Idir (%)	Equib (%)	Workers’ union (%)	Average membership Score
Participant	18	61	53	23	1.55
Comparison	36	71	19	4	1.31
Mean difference	-18***	-10**	34***	19***	0.24***

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Idir is an association established among neighbors to raise funds to cover funeral expenses and other social costs within these groups and their families. Equib is a rotating credit and saving scheme. The two are the most important informal social institutions in Ethiopia.

³² A value of 1 is assigned for the affirmative response and zero otherwise. A composite membership score is computed by adding the affirmative responses of the four questions. The score ranges from zero to four where four reflecting the highest level of network on the scale.

In sum, it seems likely that getting the job improved the women's position in the household vis-à-vis their husbands, which in turn could have strengthened their bargaining position. Next, we investigate the impact of the income and bargaining variables on consumption and leisure demand, controlling for other demand correlates.

Drivers of change in consumption and leisure demand

We attempt to identify the major transmission mechanisms through which the job could impact consumption welfare of the working women by estimating the log linear relationship between the observed welfare changes (welfare measured in terms of household consumption and food insecurity and hunger index) and the income and bargaining variables. Our empirical model is also augmented with socio-demographic variables to account for non-economic consumption welfare determinants, and the results presented in Table 17.

Table 17. Determinants of Consumption Welfare and Food Insecurity

	DLn(real per adult consumption)		DLn(per adult food consumption)		D(food insecurity and hunger scale)	
	(I)		(II)		(III)	
	Coef.	Se	Coef.	Se	Coef.	Se
Slutsky Effect						
DLn(real non-labor income)	0.029 ^{***}	(0.008)	0.024 ^{**}	(0.009)	-0.083 [*]	(0.046)
DLn(Sum of couples real earning)	0.140 ^{***}	(0.035)	0.122 ^{***}	(0.035)	-0.358 ^{**}	(0.124)
Bargaining Effect of Female wage/Distributional factors						
DLn(spouses earning difference)	-0.036 [*]	(0.015)	-0.037 [*]	(0.015)	0.327 ^{***}	(0.073)
Dummy for Gender attitude	0.037 [*]	(0.017)	0.049 [*]	(0.019)	-0.308 ^{***}	(0.090)
Dummy for Self confidence	0.004	(0.043)	0.043	(0.048)	0.189	(0.227)
Spouse age difference	0.019 [*]	(0.008)	0.011	(0.009)	0.035	(0.045)
Square of spouse age difference	-0.000	(0.000)	0.000	(0.000)	-0.002	(0.002)
Spouse education difference	0.057	(0.098)	0.019	(0.103)	-0.886	(0.467)
Organizational membership score	0.001	(0.029)	0.002	(0.033)	-0.073	(0.119)
Socio-Demographic Effects						
Employment duration	-0.152 ^{***}	(0.012)	0.026	(0.013)	-0.002	(0.055)
Adult equivalent HH size	-0.096 [*]	(0.043)	-0.092	(0.049)	-0.137	(0.221)
Dummy for television ownership	0.119 [*]	(0.051)	0.041	(0.053)	0.110	(0.237)
Dummy for Literate husband	0.154	(0.176)	-0.080	(0.186)	-0.252	(1.056)
Lag of Women Literate dummy	-0.442 [*]	(0.224)	-0.214	(0.219)	-1.004	(1.023)
Woman age # Literate	0.015 [*]	(0.007)	0.008	(0.007)	0.053	(0.032)
women completed 3 rd grade	-0.055	(0.226)	-0.158	(0.215)	1.894	(1.037)
Woman age # 3 rd grade complete	-0.000	(0.007)	0.002	(0.007)	-0.060	(0.032)
Husband age # Literate	-0.003	(0.004)	0.004	(0.005)	-0.002	(0.024)
Age of household head	0.009	(0.017)	0.016	(0.020)	-0.022	(0.078)
Square the head age	-0.000	(0.000)	-0.000	(0.000)	0.000	(0.001)
Dummy for marital status	-0.164 ^{**}	(0.052)	-0.181 ^{**}	(0.057)	0.389	(0.329)
Dummy for Orthodox Christian	0.007	(0.053)	0.039	(0.055)	0.122	(0.285)

Dummy for urban born women	-0.020	(0.048)	0.029	(0.057)	-0.000	(0.237)
Dummy for Oromo ethnic	-0.096	(0.055)	-0.077	(0.066)	-0.025	(0.240)
Dummy for livestock ownership	0.045	(0.058)	0.118	(0.074)	0.331	(0.264)
Intergenerational factors						
Dummy for parental land holding	0.055	(0.054)	0.034	(0.055)	-0.208	(0.265)
family highest years of schooling	0.008	(0.006)	0.009	(0.006)	-0.043	(0.028)
Dummy for parents owning cattle	0.005	(0.007)	0.010	(0.007)	-0.038	(0.031)
Parents owns pack animal	0.006	(0.017)	-0.002	(0.018)	-0.026	(0.073)
Constant	0.348	(0.325)	-0.066	(0.364)	1.927	(1.838)
<i>N</i>	409		409		421	
F(29 ,379)\$, (Prob > F)	21.7		4.2		3.9	
	(0.000)		(0.000)		(0.000)	
R-squared	0.5375					

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, \$ the upper degree of freedom for the F-statistic associated with the last model is 391. D refers first difference & DLn refers first log difference. The Self-confidence dummy indicates whether the women is confident enough to help her family without seeking help from her husband. A heteroskedasticity-robust estimator of the VCE of the ordinary least square estimator is used.

The overall F-statistic has a p-value of 0.000 in all of the three welfare functions indicating that the regressors are jointly significant. The results suggest that the increase in woman's earnings from getting the job positively impacted the consumption demand and food security and hunger status of her household not only by easing the budget constraint of their household (sum of the couple's real earnings) but also by improving the intrahousehold bargaining power of the women (reducing the couples earning difference). The estimated elasticity of household consumption demand with respect to women's wage income indicate that a 100 % increment in the women's salary would increase their household consumption welfare by 14% through its Slutsky effect and by 4 % through its distinguished bargaining effect.³³ This finding is fully consistent with the prediction of our theoretical model and several other studies.³⁴

Getting the job improved not only the earned income of the women but also their social skills, self-confidence and attitude towards positive gender equitable norms. Table 17 suggests that the improvement in such distributional factors positively impacted the consumption welfare of the women's household by influencing the intrahousehold bargaining process; but without directly influencing the individual preference of the couples or their joint budget set. For example, the coefficient of the gender dummy is statistically significant and positive in the two consumption welfare functions and negative in the food

³³ The vast majority of the women were not engaged in income generating activities before the emergence of the flower cluster

³⁴ Thomas's (1990, 1997) and Carrasco and Zamora (2010) also found that an increase in women's earning due to employment causes an increase in consumption of most household commodities through its influence on the household budget constraint and on the intrahousehold bargaining process.

insecurity and hunger function reflecting the additional channel through which the job positively impacted household welfare.^{35 36}

To further explore the transmission mechanism, a sample of treatment women who had reported increases in wellbeing were also asked in the survey to indicate the major causes of the improvements. They were specifically asked to choose from the long list of potential drivers, including improvements in harvest, earning from the flower cluster and increment in other sources of income. Consistent with the quantitative finding, the vast majority of the women attributed the observed improvements in wellbeing to the fact that they got the job (see Annex 4).

We ran a poisson regression model to investigate the transmission mechanisms through which the job impacted leisure demand.³⁷ Since the poisson regression model is intrinsically heteroskedastic, we employed a robust estimate of VCE for poisson maximum likelihood estimates. The estimated marginal effects and the VCE robust standard errors are reported in Table 18.

Table 18. Determinants of leisure demand

	Wife		Husband		Daughter	
	MEs	se	MEs	Se	MEs	se
Log of real non labor income	-0.004	(0.01)	-0.011	(0.02)	0.043*	(0.02)
Log of real woman's earning	-0.032**	(0.01)	0.002	(0.02)	-0.114***	(0.03)
Log of real Husbands income	-0.083	(0.07)	-0.294**	(0.11)	-0.112	(0.16)
Log of real spouses income gap	0.055*	(0.03)	0.065*	(0.03)	0.024	(0.06)
Dummy for positive gender attitude	-0.088***	(0.02)	-0.021	(0.03)	0.058*	(0.04)
Dummy for Women confidence	0.064	(0.04)	0.118*	(0.06)	0.280***	(0.08)
Membership/network score	-0.038	(0.02)	-0.073*	(0.03)	-0.011	(0.05)
Spouses age gap	0.014	(0.01)	0.004	(0.01)	0.022	(0.02)
The square of age gap	-0.000	(0.00)	-0.001	(0.00)	0.001	(0.00)
Spouses education gap	0.060	(0.09)	0.155	(0.12)	0.065	(0.18)
Employment duration in years	0.008	(0.01)	0.027	(0.01)	0.036*	(0.02)
Adult equivalent household size	-0.018	(0.04)	0.061	(0.07)	-0.105	(0.11)
Dummy for Literate husband	0.571**	(0.21)	0.183	(0.27)	0.855*	(0.35)
Dummy for Literate Woman	0.346	(0.20)	0.396	(0.31)	-0.024	(0.45)
Woman age # Literate	-0.011	(0.01)	-0.015	(0.01)	-0.003	(0.01)

³⁵ The control variables have the expected signs but most of them are insignificant.

³⁶ McElroy (1990) also found similar result. Using household data sets from Bangladesh, Indonesia, Ethiopia, and South Africa, Quisumbing and Maluccio (2000) also found a positive association between women's bargaining power and household consumption welfare. In the contrary, Fafchamps, Kebede and Quisumbing (2006) using data from poor rural Ethiopia found a weak association between women's bargaining power and intrahousehold welfare.

³⁷ A linear regression estimate may not provide the best fit over the values of the leisure demand determinants since leisure time is a count variable (Wooldridge 2009).

Women Completed 3 rd Grade	-0.187	(0.22)	0.096	(0.33)	-0.132	(0.51)
Woman age# 3 rd Grade completed	0.009	(0.01)	-0.001	(0.01)	0.009	(0.02)
Husband age # Literate	-0.016**	(0.01)	-0.006	(0.01)	-0.022*	(0.01)
Husband age	-0.000	(0.02)	-0.037	(0.02)	0.011	(0.03)
The square of husband age	0.000	(0.00)	0.001*	(0.00)	-0.000	(0.00)
Dummy for married women	-0.022	(0.05)	-0.011	(0.07)	-0.145	(0.21)
Dummy for Orthodox Christian	0.006	(0.04)	0.035	(0.08)	-0.203	(0.14)
Dummy for urban born woman	-0.009	(0.04)	0.083	(0.06)	0.129	(0.11)
Dummy for Oromo ethnicity	0.034	(0.04)	0.096	(0.07)	0.067	(0.12)
Dummy for television ownership	0.059	(0.04)	0.074	(0.07)	-0.060	(0.11)
Livestock	-0.020	(0.04)	-0.131*	(0.06)	-0.185	(0.10)
Dummy for parental land holding	-0.086*	(0.04)	0.014	(0.07)	-0.071	(0.10)
family highest years of schooling	0.007	(0.01)	0.005	(0.01)	0.011	(0.01)
Parents own cattle	0.001	(0.00)	0.006	(0.01)	-0.010	(0.01)
Parents own pack animals	-0.008	(0.01)	-0.002	(0.02)	0.051	(0.03)
Constant	1.766***	(0.45)	5.991***	(0.64)	5.586***	(0.98)
<i>N</i>	499		492		216	
Chi2(20)	222		74		133	
Prob>Chi2	0.000		0.000		0.000	

Note: Marginal effects; Standard errors in parentheses (d) for discrete change of dummy variable from 0 to 1
* p < 0.05, ** p < 0.01, *** p < 0.001 , All the variables as defined before. The dependent variable is the number of leisure hours consumed by the respective household member per month (30 days prior to interview date)

The overall chi-square statistic has a p-value of less than 0.01 in all the three models confirming jointly statistically significance in all of the leisure demand models. The estimated effect of the income and bargaining variables on the leisure demand of the women, her husband and eldest daughter mirrors the consumption welfare impact. The estimation result shows how the woman's leisure demand is negatively related with her wage rate. The increase in female wage rate arising from getting the job raises the opportunity cost of the wives leisure (the flip side of work) and hence induces them to cut their leisure time. In addition, the job decreased the spouses' income gap, and likely improved the bargaining power of the women, who in turn is making the key labor supply decision. This was confirmed in most of the FGDs; most women would like to work in the market so as to be economically independent.³⁸

Getting the job likely led the husbands to cut their leisure demand to compensate for the inability of the wife to conduct domestic chores, which is supported by the significant and positive association between the couple's income difference and the husband's leisure demand, controlling for the effect of household budget. However, this effect was rather weak leading to a large reduction in the working women's

³⁸ Hendy and Sofer (2013) also found significant correlation between females bargaining power and labor supply decisions.

leisure.³⁹ Getting the job negatively impacted the leisure demand of the women not only through the standard Marshallian price effect but also through the distinguished bargaining effect leading the woman to disproportionately reduce leisure compared to the other household members.⁴⁰

As it can be inferred from the daughters' leisure demand function, mothers wage was positively associated with the daughters' leisure time probably because daughters had to step in for their mother's forgone housework. Similarly, the husbands' leisure time was significantly and positively associated with the earning difference between the husband and his wife; and hence negatively related with the wives wage - implying that husbands were pulled into housework after their wives got the job. Interestingly, the job impacted the leisure time of the husband primarily through its influence on the relative bargaining power of the women and not through the usual Slutsky effect: In the husbands' leisure demand function, the coefficient of wives wage is insignificant while the coefficient of the spouses earning gap variable is significant.⁴¹ The results also indicate that daughters' leisure time is positively associated with their mothers' gender equitable attitudes and confidence probably because mothers with strong self-confidence and positive gender attitudes might influence the level of help that the male member of the household provide with household chores (similarly to Doss 2011).⁴²

7. Conclusion and suggestion for future research

Within the span of about a decade, the flower industry in Ethiopia has created job opportunities for a large number of poor rural women with little education and few other income-generating opportunities. Our research design and survey data from treatment and control groups of women who were balanced on observables at the time they applied for the job is likely to control for the standard selection bias that

³⁹ In the rural Ethiopia, performing domestic activities such as cleaning, washing, collecting fuel wood, fetching water and cooking are very important for a woman to be seen as a "good" or "proper" housewife.

⁴⁰ Using Spanish data, Carrasco and Zamora (2010) found similar result.

⁴¹ To put it differently, controlling for the Slutsky effect, the husbands' leisure was positively correlated with the relative bargaining power of the husband. The larger the earning difference between the husband and the wife, the higher the bargaining power of the husband since he would have a more favorable outside option (the threat point, which could be divorce). Husbands in a more favorable position were less likely to take over the women's' traditional responsibilities in the house.

⁴² The other control variables had shown the expected sign. The oldest daughters' leisure time was positively related with the non-wage income of the household. The husbands' leisure time was negatively associated with the husbands' wage (price of leisure). Because the substitution effect of the price increase was much higher than the wealth effect for individuals who earned a wage rate lower than their targeted wage rate. The husbands' leisure time had also positively associated with the husband's literacy skill and had negatively associated with his household wealth status (livestock ownership).

prevents credible analysis of impacts of salaried employment. We find that getting a job in the flower farms has had a large positive impact on the material wellbeing of the working women and the individual household members. Getting a job led to large increases in household consumption, reduced poverty and improved food security. It also improved the bargaining power of the working women, but had a negative impact on time for leisure, especially for the women. Moreover, we also document that the consumption benefits were relatively equally distributed between husbands' and wives private consumption goods, and the children benefited considerably as well.

We show that it is important to account for endogeneity of the household's allocation of labor and income. Husbands helping with domestic work to cover for the wife may imply less work at the household's agricultural plot. Together with reduced agricultural labor input from the wife, we indeed find that that getting the job reduces household income from agriculture. Moreover, the remittances received by the household decreases as an effect of the job, something that may be explained by the high visibility in family networks of women getting such a job.

Our investigation of the transmission mechanisms suggests that getting the job effected the consumption welfare not only through the income and substitution effects, but also through a bargaining effect. In addition, we find that the job improved the consumption welfare and leisure demand of their household by influencing the various distributional factors such as spouses earning gap, gender attitude, improved outside options, self-confidence and social network. The qualitative findings support the quantitative findings, but unveil additional intangible benefits and costs of female in employment in the rose farm sector.

We also note that the emergence of female labor market in the flower industry is likely to have multiplier effects and impact the local communities including the sample respondents through various channels other than the direct labor market channel. In particular, the large increase in consumption likely enhance demand for locally produced goods and services. However, we have only documented the partial equilibrium effects leaving the general equilibrium effects for future research.

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Annexes

Annex 1a: The Selection and the wage equations of the DID_3SLS Estimate of Consumption

group							
ii_9farmdist	-.000638	.0003164	-2.02	0.044	-.0012581	-.0000178	
w2info	.4106216	.0383149	10.72	0.000	.3355257	.4857175	
lrwear							
L1.	-.2901525	.0584978	-4.96	0.000	-.4048061	-.1754989	
lrhear							
L1.	.320363	.101672	3.15	0.002	.1210895	.5196365	
lrearnH_W							
L1.	-.2876116	.0864693	-3.33	0.001	-.4570883	-.118135	
lrynl							
L1.	-.0053837	.0076531	-0.70	0.482	-.0203836	.0096161	
chdbelow5	-.0513872	.0311067	-1.65	0.099	-.1123553	.0095809	
young	.0617596	.0232693	2.65	0.008	.0161526	.1073667	
workingage	.0309774	.0246236	1.26	0.208	-.017284	.0792388	
WOMAGE	-.0074957	.0156876	-0.48	0.633	-.0382428	.0232514	
WOMAGESqr	.0001742	.000213	0.82	0.413	-.0002432	.0005917	
AgeH_W	-.0001881	.0059826	-0.03	0.975	-.0119137	.0115375	
AgeH_Wsqr	.0001553	.0002541	0.61	0.541	-.0003427	.0006534	
v_4yrschoolwf	-.0019046	.0065381	-0.29	0.771	-.014719	.0109097	
EducH_W	.0732476	.0446924	1.64	0.101	-.0143478	.1608431	
mrtstatus	-.0360325	.0695316	-0.52	0.604	-.1723119	.100247	
II_3Urbth	.0069145	.0405214	0.17	0.865	-.072506	.086335	
Orthodox	-.0200478	.0495147	-0.40	0.686	-.1170948	.0769993	
parentland							
L1.	.0560837	.0492477	1.14	0.255	-.04044	.1526073	
_cons	.67165	.3308267	2.03	0.042	.0232415	1.320058	
L_lrwear							
litracYW	.0344072	.3012079	0.11	0.909	-.5559495	.6247638	
Educ3	-.2764737	.3260644	-0.85	0.396	-.9155483	.3626008	
Educ6	-.1513726	.2815596	-0.54	0.591	-.7032193	.4004741	
WOMAGE	.1041865	.0669631	1.56	0.120	-.0270589	.2354318	
WOMAGESqr	-.0009036	.0009426	-0.96	0.338	-.0027512	.0009439	
_cons	-.2980621	1.144016	-0.26	0.794	-2.540293	1.944169	
D_lrhear							
litracYH	.0433373	.1165486	0.37	0.710	-.1850937	.2717683	
AGEHUS	-.0578337	.02974	-1.94	0.052	-.1161229	.0004556	
AGEHUSsqr	.0003416	.000346	0.99	0.324	-.0003366	.0010198	
_cons	1.354087	.608094	2.23	0.026	.1622444	2.545929	

Annex 1 b: Minimum Eigen Value Test

Minimum eigenvalue statistic = 88.5613

Critical Values # of endogenous regressors: 1
 Ho: Instruments are weak # of excluded instruments: 2

	5%	10%	20%	30%
2SLS relative bias	(not available)			
	10%	15%	20%	25%
2SLS Size of nominal 5% Wald test	19.93	11.59	8.75	7.25
LIML Size of nominal 5% Wald test	8.68	5.33	4.42	3.92

Annex 2: The FIML Estimates of log of per Adult Food Consumption Equations

	Participant equation		Nonparticipant equation	
Ln(husband earning)	0.113 ^{***}	(0.02)	0.376 ^{***}	(0.09)
Ln(non-labor income)	0.044 ^{***}	(0.01)	0.074 ^{***}	(0.02)
Employment duration	-0.014	(0.01)	-0.000	(0.02)
Adult equivalent household size	-0.220 ^{***}	(0.05)	-0.241 [*]	(0.12)
Woman age	-0.023	(0.02)	-0.037	(0.07)
The square of woman age	0.000	(0.00)	0.000	(0.00)
Age husband	0.009	(0.02)	0.021	(0.03)
The square of husband age	-0.000	(0.00)	0.000	(0.00)
The square of spouse age gap	0.000	(0.00)	-0.000	(0.00)
Woman age # Literate	-0.002	(0.00)	0.000	(0.00)
Woman age #6th grade completed	0.004	(0.00)	0.003	(0.00)
Husband age # Literate	0.000	(0.00)	-0.005	(0.00)
Spouse Education gap	-0.183	(0.10)	0.098	(0.18)
Dummy for Orthodox religion	0.053	(0.06)	-0.060	(0.11)
Dummy for Urban born	-0.099	(0.05)	-0.050	(0.09)
Dummy for Oromo ethnicity	0.042	(0.06)	-0.096	(0.14)
Dummy for Married woman	-0.043	(0.08)	-0.125	(0.14)
Dummy for parental land holding	-0.036	(0.07)	-0.060	(0.10)
Constant	6.046 ^{***}	(0.34)	3.927 ^{**}	(1.34)

Note: Standard errors in parenthesis, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; dependent variable is log of per adult equivalent food consumption. Spouse education gap implies husband can read and write but not the wife

Annex 3a: FIML estimate of Wives' Leisure demand equation

	Participant		Nonparticipant	
lhear	1.191	(1.46)	-15.168	(10.50)
Lynl	-1.356*	(0.59)	0.712	(1.87)
Exprfix	-0.332	(0.66)	-0.145	(2.27)
adehhsz	0.491	(3.28)	-8.583	(13.18)
WOMAGE	-4.635***	(1.26)	-0.237	(7.84)
WOMAGESqr	0.046*	(0.02)	0.006	(0.13)
AGEHUS	-1.359	(1.04)	-0.701	(3.82)
AGEHUSsqr	0.025	(0.01)	-0.005	(0.07)
AgeH_Wsqr	-0.034	(0.03)	0.061	(0.15)
WageEduc1	0.040	(0.20)	0.067	(0.50)
WageEduc6	0.069	(0.14)	0.047	(0.45)
HageEduc1	0.050	(0.15)	-0.154	(0.40)
EducH_W	3.917	(6.52)	-15.698	(20.16)
Orthodox	-1.084	(4.03)	0.789	(12.21)
II_3Urbth	2.186	(3.40)	-2.864	(10.28)
Oromo	-8.921*	(3.57)	12.051	(15.38)
Mrtstatus	-4.803	(5.23)	28.322	(14.99)
parentland	3.033	(4.17)	-17.934	(10.03)
_cons	140.978***	(22.30)	219.527	(134.37)

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.00$

Annex 3b: FIML Estimate of Husbands' Leisure Demand Equation

	Participant equation		Nonparticipant Equation	
lhear	-4.095	(2.41)	-9.142	(8.90)
lynl	-0.488	(1.03)	0.138	(1.49)
exprfix	1.531	(1.11)	0.123	(1.91)
adehhsz	2.690	(5.52)	-11.515	(11.06)
WOMAGE	0.582	(2.16)	-9.481	(6.35)
WOMAGESqr	-0.030	(0.03)	0.110	(0.11)
AGEHUS	-6.782***	(1.77)	0.826	(3.20)
AGEHUSsqr	0.099***	(0.02)	0.017	(0.05)
AgeH_Wsqr	-0.076	(0.04)	-0.024	(0.12)
WageEduc1	-0.745*	(0.33)	0.966*	(0.42)
WageEduc6	0.461	(0.24)	-0.501	(0.38)
HageEduc1	0.314	(0.25)	-0.878**	(0.34)
EducH_W	-16.366	(11.00)	28.467	(16.66)
Orthodox	-5.251	(6.77)	2.688	(10.26)
II_3Urbth	5.011	(5.76)	10.880	(8.65)
Oromo	-1.189	(6.04)	15.749	(12.66)
mrtstatus	0.327	(8.82)	3.037	(12.41)
parentland	16.594*	(7.27)	-4.561	(8.20)
_cons	198.144***	(37.18)	278.688*	(109.95)

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.00$

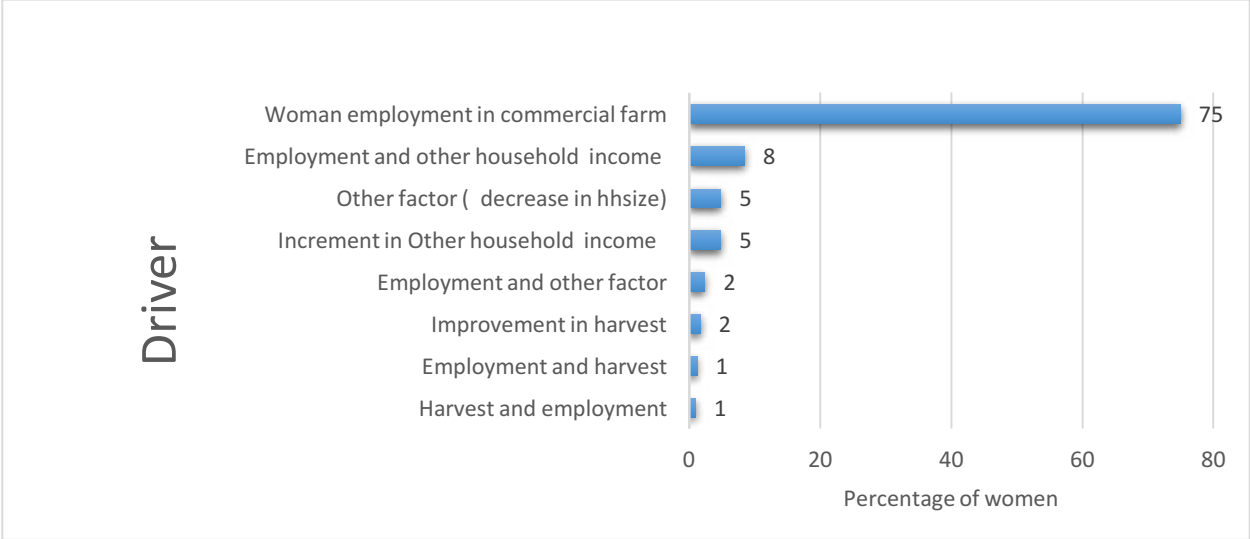
Annex 3c: FIML Estimate of Daughters' Leisure Demand Equation

	Participant Equation		Non-participant Equation	
lhearn	-2.997	(5.75)	-7.283	(11.35)
lyn1	1.445	(2.03)	2.570	(1.83)
exprfix	3.130	(2.22)	5.207*	(2.33)
adehhsz	-1.786	(10.90)	-15.843	(12.92)
WOMAGE	-18.394***	(4.86)	-9.702	(10.45)
WOMAGESqr	0.213**	(0.07)	0.120	(0.16)
AGEHUS	-2.882	(3.74)	0.618	(4.15)
AGEHUSsqr	0.021	(0.05)	0.018	(0.07)
AgeH_Wsqr	0.047	(0.07)	-0.144	(0.15)
WageEduc1	-0.053	(0.62)	-0.886	(0.46)
WageEduc6	0.785	(0.50)	-0.139	(0.46)
HageEduc1	-0.053	(0.48)	0.634	(0.37)
EducH_W	6.634	(21.51)	-38.443	(20.11)
Orthodox	-18.584	(15.72)	57.379***	(13.45)
II_3Urbth	10.424	(12.03)	4.028	(11.29)
Oromo	5.249	(14.84)	25.488	(19.13)
mrtstatus	-11.545	(21.88)	4.996	(21.93)
parentland	-8.515	(16.60)	-4.287	(10.80)
_cons	560.808***	(96.81)	254.074	(152.36)
Standard errors in parentheses		* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$		

Annex 3d: FIML Estimate of Sons' Leisure Demand Equation

	Participant equation		Non-participant Equation	
lhearn	1.532	(4.60)	-36.814**	(13.61)
lyn1	0.174	(2.03)	1.030	(2.29)
exprfix	5.953**	(2.21)	3.566	(3.08)
adehhsz	-18.690	(11.56)	-10.066	(14.81)
WOMAGE	-3.349	(5.28)	14.894	(10.18)
WOMAGESqr	0.018	(0.07)	-0.271	(0.16)
AGEHUS	-5.089	(4.64)	-7.959	(4.70)
AGEHUSsqr	0.058	(0.06)	0.131	(0.07)
AgeH_Wsqr	-0.034	(0.11)	-0.273	(0.16)
WageEduc1	0.580	(0.65)	0.000	(0.61)
WageEduc6	-0.004	(0.50)	0.855	(0.58)
HageEduc1	-0.611	(0.51)	-0.648	(0.49)
EducH_W	10.646	(22.94)	-11.957	(25.58)
Orthodox	26.684	(15.68)	-5.621	(19.46)
II_3Urbth	31.781*	(12.56)	1.354	(13.45)
Oromo	-5.020	(13.74)	3.122	(19.71)
mrtstatus	-4.112	(25.70)	23.797	(30.38)
parentland	21.775	(15.96)	-34.625*	(13.66)
_cons	277.348**	(95.50)	322.034	(165.35)
Standard errors in parentheses		* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$		

Annex 4: Drivers of the observed living standard improvements



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INDEXING TERMS

Salaried employment

Wage labor

Gender

Bargaining

Consumption

Poverty

Hunger

We examine the welfare impacts of women getting low-skilled jobs and find large positive effects, both at the household and the individual level. However, the women workers, their husbands and their oldest daughters reduced their leisure, but women to a much larger extent than the others. The leisure of the oldest son did not change. Investigating the transmission mechanisms suggests that the impacts did not only go through income and substitution effects, but also through a bargaining effect. Getting the job likely improved the bargaining position of the wife through several mechanisms, which in turn added to the positive impact on her welfare.