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Did a Microfinance 'plus' Programme Empower Female Farmers and Pastoralists and Improve Intrahousehold Equality in Rural Ethiopia?

Evidence from an Impact Evaluation Using a Project-Women's Empowerment in Agricultural Index (pro-WEAI) Survey Tool

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Contents

ABSTRACT

Using the project-Women's Empowerment in Agricultural Index (pro-WEAI) survey tool developed by GAAP2, this study aims to estimate the impact of a microfinance 'plus' programme on women's economic empowerment in communities in Oromia and Afar, Ethiopia. The programme incorporates multiple interventions, which are implemented through women-run rural savings and credit cooperatives (RUSACCOs), with the intention of improving beneficiary women's decision-making over productive assets, control over income, and leadership in rural institutions. A major component of the programme is aimed at rural women's greater access to credit, but interventions also include agricultural livestock and technology transfers, business training, as well as a community gender awareness component.

A difference-in-difference estimator with Inverse Probability Weighting (IPW) is used to evaluate the impact of the programme on women's empowerment in Oromia. Because of conflict in the area, baseline data collection was delayed and data was collected after some interventions had already begun in Oromia. As such, nearly all beneficiaries already had access to credit through the RUSACCOs at baseline, and both women and men were already empowered in a number of dimensions at baseline. Among households with beneficiaries who continued in good standing between baseline and midline, the programme positively contributed to both women's and men's empowerment with regards to respect among household members. It did not lead to additional impacts in terms of overall empowerment and gender parity within the household or across the other pro-WEAI indicators. However, it appears that, by maintaining good standing in the RUSACCOs, female participants were able to maintain high levels of empowerment across the other indicators. A second group of beneficiary women, who either chose to leave the RUSACCO or did not maintain good standing as a member, were also highly empowered across many dimensions at baseline but experienced large average decreases in empowerment across a number of indicators by midline.

In Afar, using the midline data only, a single-difference estimator with Inverse Probability Weighting is used to evaluate the impact of the programme. In Afar, the programme had a significant impact on women's overall empowerment. As we expected, given the nature of the programme, there were significant positive results in terms of access to and decisions on financial services, group membership, and membership in influential groups. There were also positive impacts on control over the use of income, suggesting that the programme contributed to greater control over the use of the output from agricultural activities and control over income from agricultural and non-agricultural activities. On the other hand, the programme also appears to have resulted in reduced empowerment on average with regards to autonomy in income.

Keywords: pro-WEAI; women's empowerment; gender parity; agricultural households, Ethiopia; microfinance

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ACRONYMS

A4NH	Agriculture for Nutrition and Health
FAO	Food and Agriculture Organization of the United Nations
GAAP2	Second Phase of the Gender, Agriculture, and Assets Project
IFPRI	International Food Policy Research Institute
IFAD	International Fund for Agriculture Development
Pro-WEAI	Project-Women's Empowerment in Agricultural Index
3DE	Three Domains of Empowerment score
RUSACCOs	Rural savings and credit cooperatives
UNJP-RWEE	UN Joint Programme focused on Rural Women's Economic Empowerment
WFP	World Food Programme

1. Introduction

Microfinance is thought to not only be an effective and sustainable tool for poverty alleviation but also an effective tool for empowering women. Access to credit provides women with the opportunity to invest in income-generating assets and activities, and thus, has the potential to increase earnings. At the household level, greater earning potential could empower women by giving them a larger role in the household's decision-making processes and more say in their lives. At the community level, micro-lending may be empowering in that initiatives are typically organized as part of women's self-help groups. Self-help groups provide collective support and a space to build trust and confidence among members. Depending on the group, the participation process can also raise awareness about social issues and rights.

A UN Joint Programme focused on Rural Women's Economic Empowerment (UNJP-RWEE) that was implemented in the communities of Oromia and Afar, Ethiopia, provided women with greater access to credit through women-run rural savings and credit cooperatives (RUSACCOs). While the primary component of the UNJP-RWEE was micro-credit, the programme also included numeracy, literacy, finance, and business-development training; agricultural livestock and technology transfers; agricultural training; and community-run educational conversations in healthy eating choices and nutrition. In addition, community leaders were trained to conduct community conversations aimed at raising consciousness about personal gender biases, beliefs, and attitudes. The aim was to promote increased awareness, among both women and men, about how gender norms manifest within their households and communities and to advance a mindset toward gender equality.

The Food and Agricultural Organization of the United Nations (FAO) and the International Fund for Agriculture Development (IFAD) partnered with GAAP2 (Gender, Agriculture and Assets Project, Phase 2), led by the International Food Policy Research Institute (IFPRI), to conduct a mixed-methods impact evaluation of the first two years of the programme interventions. In this study, we investigate the impact of the UNJP-RWEE on women's empowerment across multiple dimensions in the communities of Oromia and Afar, Ethiopia, using the project-Women's Empowerment in Agricultural Index (pro-WEAI)

survey tool developed by GAAP2.[1] The pro-WEAI survey tool is unique in that, in addition to collecting data to measure the economic conditions that help facilitate empowerment (e.g. asset ownership, access to credit), it also collects data to measure individual agency within an agricultural household. The tool is comprised of 12 indicators, organized into three domains of empowerment, namely: intrinsic agency, instrumental agency, and collective agency (Malapit et al., 2019). Intrinsic agency measures self-respect and the internal empowerment of an individual. Individuals who internalize the assumption they are subordinate, or are not comfortable acting based on what is best for them due to fear of going against what is considered appropriate in society or the community, are not empowered. Instrumental agency measures economic empowerment, which includes an individual's access to productive resources and the capacity to make decisions about these resources. Collective agency considers community influence and social power (Malapit et al., 2019).

Previous studies that evaluate the impact of microcredit programmes implemented through groups on women's empowerment have mixed findings. Some studies find that improved access to microcredit and finance leads to women's greater empowerment (e.g. Bali Swain & Wallentin, 2009; Deininger & Liu, 2013; Desai & Joshi 2014; Mukherjee & Kundu, 2012; Pitt et al., 2006); while others find no impact (e.g. Banerjee et al., 2015) or even a negative impact on empowerment in some cases (e.g. De Hoop et al., 2014; Garikipati, 2008; Goetz & Sen Gupta, 1996). The different findings are partly due to the different measures of empowerment used. There is not a clear construct of empowerment that is implemented consistently throughout the literature. Even among studies that measure the same aspect of empowerment, there are large variations in how the measure is constructed (e.g. Brody et al., 2017). For example, De Hoop et al. (2014) explore the impact on women's decision-making power based on whether women make decisions about food expenditure, whereas Mukherjee and Kundu (2012) measure women's decision-making power through an index focused on household expenditure. In contrast, Desai and Joshi (2014) investigate

[1] This paper primarily focuses on the quantitative component of the mixed-methods impact evaluation, but it refers to the findings of the qualitative study throughout.

women's empowerment through their decision-making power in terms of children's schooling, health expenditure, and decisions about family size.

Our literature review indicates that none of these studies have explored women's empowerment in terms of intrinsic agency, instrumental agency, and collective agency measured together and in relation to a male member in the household using the pro-WEAI. Some studies do investigate intrinsic agency (e.g. De Hoop et al., 2014; Kim et al., 2007). Most studies, however, focus on instrumental agency, such as greater control over assets or financial resources (Deininger & Liu, 2009), greater decision making within the household (Banerjee et al., 2016; De Hoop et al., 2014; Deininger & Liu, 2009; Mukherjee & Kundu, 2012), mobility (De Hoop et al., 2014; Deininger & Liu 2009), and political agency (Deininger & Liu, 2009; Desai & Joshi, 2014). Only a handful of studies measure women's empowerment as a multi-dimensional concept, but many of these still heavily focus on instrumental agency (e.g. Desai & Joshi, 2014; Pitt et al., 2006).

There are also large variations in the interventions that are evaluated. Many of the microcredit interventions are implemented without the explicit intention to empower women beyond the potential to increase income through improved access to credit (Gugerty et al., 2019). Interventions like the UNJP-RWEE that incorporate a gender awareness component that challenges rigid intrahousehold gender relations and social norms that prevent women's empowerment, could be more successful in empowering women. Indeed, there is some evidence of larger positive impacts on empowerment when interventions incorporate a gender training component that raises consciousness and discusses gender norms and rights (Duvendack & Mader, 2019). As an example, a recent randomized control trial in Vietnam that included gender awareness, roles, and equality training components within a credit intervention, found that female credit beneficiaries who participated in this training were more likely to be empowered in terms of internal control over their lives as well as intra-household decision making than non-participants (Huis, Lensink, & Hansen, 2019). It also reduced relationship friction, with more pronounced empowerment outcomes over a longer period of time (Huis, Lensink, and Hansen, 2019).

Gender awareness training can be particularly important in settings where conservative gender norms prevail. Negative repercussions can result from improving women's economic positions through a program without addressing rigid gender beliefs in the communities. For example, De Hoop et al. (2014) finds that members of women's self-help groups in villages in Odisha, India, likely enhanced women's overall autonomy but in communities where strong norms counteract women's empowerment, the study found evidence of resistance to women's increased agency. This is consistent with other quantitative studies that find that women's greater autonomy and membership in microfinance groups can lead to increased violence, particularly in conservative communities (Koenig et al., 2003). Increased household decision-making by women is also associated with a greater likelihood of intimate partner violence, suggesting that promoting women's autonomy without men's support can put women at risk (Rahman et al., 2011).

Beyond the gender awareness components, other studies provide evidence that a microfinance "plus" programme may be more effective at empowering women (e.g. Krenz et al., 2014) or at least more effective in providing greater outreach (e.g. Lensink et al., 2018) as compared to a programme that offers only microfinance by tailoring the programme to the needs of the community. Indeed, microfinance interventions by themselves are not always enough for empowerment. For example, in rural communities in India, Garikipati (2008) finds that poor women who lack their own productive assets may not see consistent improvements in their status within their household, even if loans strengthen the households' coping mechanisms. Because women own few assets in these communities, when the loans are invested in productive assets, they are often invested in assets owned by male family members, making it difficult for women to control the addition income earned from the investment (Garikipati, 2008). An intervention that couples productive asset transfers with microcredit, in this case, could be more successful at empowering women.

The collaboration with GAAP2 provides a unique opportunity to investigate whether the UNJP-RWEE, a microfinance "plus" programme that explicitly aims to empower women, does indeed empower women across multiple dimensions and in relation to men in the same households. The socio-economic aspects of the communities in Oromia and Afar differ, and the UNJP-RWEE was tailored to the needs of

the communities in these two regions. Because of this, the impacts are analyzed separately for each region. In Oromia, we find that the programme had a positive impact on empowerment in terms of respect among household members for the beneficiaries with continued access to credit through the RUSACCOs. We do not see impacts on overall empowerment or gender parity within the household. These beneficiaries were, however, already highly empowered across several dimensions of the pro-WEAI when the baseline survey was administered and by remaining in good standing in the RUSACCOs, it appears that they were able to maintain the same high levels of empowerment.

In Afar, we find that the programme had significant positive impacts on women's overall empowerment. Looking at the indicators separately, as expected, it appears there were significant positive impacts on access to and decisions on financial services, group membership, and membership in influential groups. There were also positive impacts on control over the use of income, suggesting that the programme contributed to greater control over the use of outputs from agricultural activities and over income from agricultural and non-agricultural activities. Interestingly, however, this coincided with decreased autonomy of income.

The rest of this paper is arranged as follows: the next section describes the UNJP-RWEE interventions in Oromia and Afar in detail, and Section 3 describes the pro-WEAI survey tool used to collect the data, the sampling strategy, and the data. Section 4 presents the descriptive statistics as well as the pro-WEAI indicators. Section 5 discusses the empirical framework for measuring the impact of the programme on empowerment. Section 6 presents the results and, finally, Section 7 concludes.

2. UN Joint Programme on rural women's empowerment in Ethiopia

In 2012, FAO, IFAD, the World Food Programme (WFP), and UN Women launched a Joint Programme called "Accelerating Progress towards the Economic Empowerment of Rural Women" in seven countries: Guatemala, Kyrgyzstan, Liberia, Nepal, Nigeria, Rwanda, and Ethiopia. The programme's objectives are to (1) establish a gender responsive policy framework that provides an institutional environment for women's economic empowerment; (2) improve household food security and nutrition; (3)

improve women's decision-making and control over income; and (4) strengthen women's participation and leadership in rural institutions and organizations. These objectives are achieved through several different but mutually reinforcing interventions, all of which are designed to improve the overall conditions for advancing rural women's empowerment.

The UNJP-RWEE in Ethiopia officially began in November 2014 and is expected to continue until through 2021. While the four United Nations agencies provide technical and financial support, the programme is implemented by federal, regional, and district-level partners in the regions of Afar and Oromia.[2] With the support of the UN agencies, the federal and regional partners chose eight beneficiary villages (kebeles) in four districts (woredas) in the two regions. Six beneficiary kebeles were selected in Oromia: (1) Illuf Dirre and (2) Nannoo Chemerri in the Yaya Gulele Woreda; (3) Bura Adelle and (4) Wabe Burkitu in the Dodola Woreda; and (5) Abine Garmamme and (6) Annenno Shisho in the Adami Tulu Woreda. Two beneficiary kebeles were selected in Afar: (7) Asboda and (8) Boyina in the Dubti Woreda.

In Oromia, activities began in 2016 by strengthening the technical capacity of RUSACCOs that offer financial products to women farmers and pastoralists with the aim of targeting at least 1,500 women through the chosen RUSACCOs. The RUSACCOs are self-governed by the all-female members. Membership requires saving a fixed amount every month and participating in the required group activities. The UNJP-RWEE increased the RUSACCOs' capacity to provide cash loans through revolving funds at low interest rates and provided additional training in financial literacy, entrepreneurship skills, and business development. The loans ranged from about 4,000 to 15,000 Ethiopian Birr (about 140 to 522 USD[3]) with interest rates from two to three percent in Dodola, around five percent in Adami Tulu, and between five and 11 percent in Yaya Gulele. To qualify for credit through a RUSACCO, a woman must have lived in the kebele for at least two years; be over 18 years of age; be productively engaged in an income generation activity (IGA); have good credit history and no current debt; be willing to participate in all project activities;

[2] The federal partners include the Ministry of Women and Children Affairs (MoWCA), the Ministry of Finance and Economic Cooperation (MoFEC), the Ministry of Agricultural and National Resources (MoANR), and the Federal Cooperative Agency (FCA).

[3] The average exchange rate for July 2019 was 1 ETB = 0.0349 USD.

and be willing to share her experience with other women in the group. Beneficiaries can take out more than one loan. However, to qualify for additional loans, the previous loan must be fully repaid. Between 2016 and the end of 2018, 3,033 loans were disbursed in the Oromia woredas, with the largest number disbursed in the Yaya Gulele communities.

In 2017 and 2018, the beneficiaries in all three woredas in Oromia also received seeds, water pumps, and hoses. In addition, small ruminants were distributed to be fattened and bred. In Dodala, 700 goats and sheep were distributed to 100 beneficiaries and 800 goats were distributed to 100 beneficiaries in Adami Tulu. Only 100 goats were distributed to 25 beneficiary women in Yaya Gulele. However, unlike the other two woredas in Oromia, the communities in Yaya Gulele received a farmer's training center to support women's economic development, beehive and honey making equipment, and milk processing equipment.

In Afar, initial activities started later than in Oromia and began by first establishing RUSACCOs, as none existed in the selected communities. By the end of 2018, there were 460 female members of the RUSACCOs which had disbursed 228 loans ranging from 9,700 to 15,000 Ethiopian Birr through the UNJP-RWEE. In addition, 15 diary heifers, 90 goats, livestock feed, and milk processing technologies were distributed as part of the programme.

In both Oromia and Afar, members of the RUSACCOs also had access to agricultural training courses. Depending on the needs of the community, the courses addressed control and management of local household food reserves, growing small-scale fodder, vegetable and crop production innovations and small ruminant management practices. In addition, community facilitators were trained to conduct gender-focused community conversations directed at both men and women. These dialogues focused on awareness of gender norms and beliefs, rural women's access to and control over resources and agricultural productivity, and greater distribution and sharing of household responsibilities. They encouraged greater awareness of social norms that constrained women's involvement in decision-making over economic resources and leadership, and aimed for increased community receptiveness of gender equality. Development agents, kebele development community members, and woreda experts were also trained in

good nutrition practices, including dietary diversity and complementary food preparation practices, which were shared with the community.

Given the large number of interventions in the beneficiary communities, it is evident that the UNJP-RWEE in Ethiopia is not conceptualized as a one- or two-pronged livelihood intervention. The programme follows an integrated approach, simultaneously incorporating multiple interventions at different levels in the beneficiary communities with the aim of economically empowering beneficiaries. With the exception of the community conversations, the programme is implemented through the RUSACCOs. The different interventions are provided to beneficiaries based not only on their eligibility, but also their choice, so there is some selection of the package of interventions received. Even so, the financial aspect, particularly access to credit, is a major component of the UNJP-RWEE in Ethiopia.

3. Survey tool, sampling framework, and description of the data

The pro-WEAI survey tool is comprised of 12 indicators. The survey instrument, as used in this study, includes modules for 11 of the 12 indicators: (1) autonomy in income; (2) attitudes about intimate partner violence; (3) respect among household members; (4) input in productive decisions in agriculture; (5) ownership of land and other assets; (6) access to and decisions on financial services; (7) control over use of income; (8) work balance; (9) visiting important locations; (10) group membership; and (11) membership in influential groups.[4] The first three indicators measure Intrinsic Agency. The next six indicators are measures of Instrumental Agency. The last two indicators fall within the Collective Agency domain. Table 1 provides more detailed information about each empowerment indicator in these three domains and how they are estimated (Malapit et al., 2019).

[4] The self-efficacy module was not included in the surveys.

Table 1. Pro- WEAI indicators used in the UN Joint Programme Study

	Indicators	Descriptions
Intrinsic agency	**Autonomy in income**	The autonomy in income indicator is calculated from a vignette-based module and focuses on the decision-making on the use of income generated from both agricultural and non-agricultural activities. A person is considered to be empowered if he or she is more driven in his or her decision-making by his or her own principles than by what other people consider appropriate.
	Attitudes about intimate partner violence	The attitudes about intimate partner violence are determined based on whether the individual believes a husband is justified in hitting or beating his spouse in five scenarios. A person is considered to be empowered only if he or she believes the husband is not justified in hitting or beating his spouse in any situation.
	Respect among household members	The respect among household members indicator is calculated from a module that asks the respondent about whether the individual respects his or her spouse or other relation in the household, whether his or her spouse or other relation respects him or her in return, whether he or she trusts his or her spouse or other relation to do things that are in his or her best interest, and whether the respondent feels comfortable disagreeing with his or her spouse or other relation. A person is considered empowered if they answer most of the time to all four of the questions.
Instrumental agency	**Input in productive decisions in agriculture**	Empowerment in the input in productive decisions in agriculture is determined by either making the decision over the activity solely, making the decision over the activity jointly and having at least some input into the decision, or making the decision if they wanted to in all agricultural activities the individual participates in. If the individual does not participate in an agricultural activity, they are not empowered.
	Ownership of land and other assets	Empowerment in ownership of land and other assets is measured by owning solely or jointly either (i) land, (ii) at least two of the following: large livestock, small livestock, fishpond or fishing equipment, mechanized equipment, non-farm business equipment, house or building, large consumer durables, or means of transportation, or (iii) all three of the following: poultry, non-mechanized equipment, or small consumer durables.
	Access to and decisions on financial services	Empowerment in access to and decisions on financial services is determined by either (i) belonging to a household that used a source of credit in the past year and participated in the decision to take the loan solely or jointly with others, (ii) belongs to a household that could have taken out a loan in the last year even if it did not; or (iii) has access to a financial account, solely or jointly.
	Control over use of income	Empowerment over use of income means that for all agricultural activities the individual participates in, the individual has control over how any income earned from the activity is used and control over whether the output from the agricultural activities is used for home consumption. The individual also has control over the income over any non-farm, self-employment activities and wage or salary employment they engage in.
	Work balance	Empowerment in the work balance indicator means that the individual spends less than 10.5 hours a day in work, where work includes employment and non-employment activities. When a work activity includes childcare is a secondary work activity, the total time with the two activities simultaneously is counted as 1.5 time spent in work.
	Visiting important locations	Empowerment in mobility is determined by whether the individual (i) visits at least two locations—either the city, market, family or other relative--at least once a month, or (ii) visits a health facility or public meeting at least once a month.
Collective agency	**Group membership**	Group membership is determined by being an active member in at least one of the following types of groups: Agricultural, livestock, fisheries producers' group; water users' group; forest user's group; credit or microfinance group; mutual help group; or trade and business group.
	Member of influential groups	Being empowered in terms of leadership means the individual is an active member of at least one influential community group.
Source: Malapit et al. 2019		

3.1 Oromia

Because of conflict and social unrest in the region, the timing of the data collection at baseline was delayed. As a result, the baseline data was collected in December 2016 to January 2017 after 300 beneficiaries in each of the three woredas in Oromia had already received loans and some training had already taken place.[5] The midline survey was administered from February to March 2019. Between the baseline and midline surveys, 2,133 additional loans were disbursed in Oromia, 65 percent of which had been repaid by late 2018.

The sample was randomly drawn from the RUSSACO members in the beneficiary communities at baseline, and from two comparable kebeles in each of the three woredas.[6] The decision to sample from the beneficiary households rather than from the whole village was to ensure that the sample included enough program participants. This was less likely if we sampled at the village level. The comparison kebeles in Oromia are adjacent communities in which the UNJP-RWEE does not operate but that are similar in size; have similar agricultural systems, livelihoods; and cultural norms, and thus are deemed valid counterfactuals. The baseline survey was administered to 750 households. In the beneficiary communities, 390 women were interviewed, while 360 women were interviewed in the comparison communities. Within the same households, a male respondent, typically the spouse, was also interviewed when possible. In all, 312 men in the beneficiary community and 318 men in the comparison communities were interviewed at baseline. At midline, follow-up interviews were conducted with 389 women in the beneficiary communities and 358 women in the comparison communities, and 303 men in the beneficiary households and 314 men in the comparison communities. In all, there are 736 households where the same female respondent was administered the survey at both baseline and midline.

[5] These included the financial training, agricultural technical training and community gender dialogues.

[6] In Oromia, the comparison communities are Lemi, Dedfe, Haleko Gulenta Boke, Werji Washingula, Baressa, and Keta Berenda.

A significant number of observations for the empowerment indicator capturing respect among household members are missing, mainly from households where the primary respondent is widowed or separated and the other household members are adult children.[7] For the majority of these households, observations from both the baseline and midline data are missing. Because of this, we first investigate women's empowerment across ten dimensions by excluding the indicator respect among household members. This sample includes all women regardless of marital status. We then limit the sample to married women and men and investigate empowerment across all eleven dimensions.

There are other programmes in both the comparison and beneficiary communities that provide access to credit. However, according to the UNJP-RWEE qualitative study, the largest difference between the comparison and beneficiary communities is the number of loans available at low interest rates in the beneficiary communities through the RUSACCOs (Nigussie et al., 2017). At baseline, nearly all of the comparison households and all beneficiary households report having access to at least one source of credit. However, the households in the beneficiary communities were more likely to have credit through a RUSACCO. Nearly all of the beneficiary households had access to credit through a RUSACCO, compared to about three-fourths of households in the comparison communities. In addition, more loans were taken out in beneficiary households, nearly all of which were granted by a RUSACCO. In the beneficiary communities, 66 percent of households reported already taking out a loan through a RUSACCO at baseline, compared to only 12 percent of households in the control communities. For most households who obtained a loan through a RUSACCO, this was the household's only loan.

There is a decrease in overall access to credit across all types of credit sources in both the comparison and beneficiary households by midline. This may be due to economic losses in the communities

[7] The intrahousehold relationships module in the UNJP-RWEE pro-WEAI survey is used to estimate the respect among household members. It is an empowerment indicator that includes different relationships within the household—such as spouse, the mother-in-law, father-in-law, etc.—but it does not explicitly query the relationship between an adult head and her adult children.

as a result of conflict-induced internal displacements that is estimated to involve millions, pest infestation and changing weather patterns that have heavily impacted agricultural communities, and loss of other aid. Within the programme, there appears to be group of beneficiaries who either chose to leave the group or failed to maintain good standing and who therefore no longer have access to credit though the RUSACCO. This does not seem to be the result of defaulting on the initial loans from the RUSACCOs. The UNJP-RWEE records indicate that all loans disbursed in 2016 (before the baseline data collection) have been repaid. It could, however, be due to beneficiaries not being able to continue with the other requirements of the group, such as saving every month and participating in all required activities. Additionally, within a programme assessment report at the end of 2016, beneficiaries noted challenges around fairness in distribution. A paper based on the qualitative data later affirms possible issues with group dynamics in some of the communities. Most of those who either chose to leave or did not maintain good standing in the group are from the communities in the Adami Tulu and Dodola woredas. Mulema et al. (N.D.) suggests that the communities in these woredas may not have had as strong a staff field presence as the Yaya Gulele communities. In Yaya Gulele, the field staff helped to mediate differences in views between the beneficiaries and the woreda focal persons related to the programme (Mulema et al., N.D.). The RUSACCO's are community-run by women and discussions with field staff suggest that there are also differences in management styles across the different RUSACCOs.

An additional factor is that nearly twice as many loans were distributed in Yaya Gulele in 2017 and 2018 than in the Adami Tulu and Dodola communities. It is not clear why this is the case from the reports. However, these loans were offered at higher interest rates, suggesting there may have been a greater demand for credit in the communities in Yaya Gulele than in the communities in the other two woredas.[8] The

[8] In Yaya Gulele, 1,031 loans were disbursed, ranging from 7,000 to 15,000 Ethiopian Birr, with interest rates of between 7.5 and 10.5 percent. Fewer loans were disbursed in the other two woredas in Oromia, and the loans were generally smaller than those in Yaya Gulele. In Adami Tulu Woreda, 562 loans were disbursed, ranging from 4,000 to 10,000 Ethiopian Birr in value at an interest rate of 5 percent. In Dodala, 540 loans were disbursed, with loans ranging between 4500 and 9000 Ethiopian Birr, at interest rates of 2 to 3 percent.

communities in Yaya Gulele are closer to Addis Ababa than the others and, thus, may have greater access to certain markets. On the other hand, Nigussie et al. (2017) report that beneficiaries requested larger loans in Adami Tulu and the requests were not often granted, and as a result many beneficiaries reverted back to traditional practices that had less earning potential. These differences may have contributed to more beneficiaries in Adami Tulu and Dodola communities to choose to leave the group or to fail to maintain good standing in the group than in the Yaya Gulele communities.

We investigate these two groups separately. The first group maintained good standing in the RUSACCO between the baseline and midline surveys. These are the beneficiaries who reported being a member of a RUSACCO at midline and reported having access to credit (meaning they took out a loan or could if they wanted to) through the RUSACCO between baseline and midline. While all the female beneficiaries in this group had access to credit, about 60 percent chose to borrow at least once between baseline and midline. Collateral is not required for the loans. Instead, the spouse typically guarantees the loan and, as such, exercises some control over the use of the loan. The data suggests, however, that female beneficiaries who borrowed generally maintained control over its use, either solely or jointly with a spouse. Additionally, beneficiaries reported making decisions about how to use the money to a high or at least a medium extent. The final sample for this group is 249 female beneficiaries. In 163 beneficiary households, there is data from both spouses. We refer to this group as beneficiaries who continued in good standing.

The second group consists of those who were beneficiaries, but left the group or failed to maintain good standing and no longer have access to credit though the RUSACCO.[9] While this group does not have access to credit or the other interventions through the UNJP-RWEE, there may be some spill-over from the other activities into the community. The final sample for this second group is 124 female beneficiaries. In 84 households, there is data from both spouses. We refer to this group as beneficiaries who lost access to

[9] Between the baseline and midline surveys, these individuals report not being a member of the RUSACCO at midline (70 percent, 88 percent of which were members at baseline) or report being a member but not having access to credit through the RUSACCO (30 percent, 86 percent of whom were members of the RUSACCO at baseline).

credit. The comparison data consists of 350 women. In 281 comparison households, there is data from both spouses.

3.2 Afar

In Afar, enumerators had difficulty locating the beneficiary households for the baseline survey because of civil unrest and the fact that many households are nomadic pastoralists. Randomly selected beneficiaries could not be traced and administrative issues made it difficult to find additional replacement beneficiary households. In addition, a number of beneficiaries at baseline reported not knowing the programme, likely because the programme had not yet begun, and were reluctant to participate in the survey. As a result, the baseline data collection was terminated early. The midline survey encountered fewer challenges and included additional demographic and credit questions from 2016. Two comparison kebeles for the two beneficiary communities in the Dubti woreda were initially selected. A third was added during data collection due to the low response rate in the original two.[10] In all, the survey was administered to 446 women at midline. In the same households, the survey was administered to only a few men at midline, as most were away or unavailable.

Credit is limited in the Afar communities. In 2016, only the treatment group had access to credit through a microfinance institution, lender, or bank. At midline, about half of the female beneficiaries chose to borrow at least once through the RUSACCO and like in Oromia, the data suggests that they maintained control over the loans. None of the households in the comparison group had borrowed. The final sample in Afar is 237 female beneficiaries and 198 women from the comparison households.

[10] In Afar, the comparison communities are Hanikesen and Aredo. Gudmaydil Gayder was added during the field survey at midline because of the high non-response rate in the other communities.

4 Descriptive statistics

4.1 Oromia

Demographic and household characteristics in the Oromia communities at baseline are presented in Tables 2 and 3. Women in these communities are on average the late thirties, and the majority of them are married. Their spouses are on average in their early to mid-forties. The mean household size is between six and seven members. Nearly all respondents report participating in cropping and livestock activities on the household farm. About 60 percent of women in the treatment group and about half of women in the comparison group engage in agriculture as their main income earning activity.

Around 80 percent of households hold land. In the couple households, about three quarters of spouses report claiming rights to land. A wealth index was constructed from the dwelling characteristics and household assets at baseline, as explained in Appendix A. The index excludes land holdings as there are large data gaps in the land ownership and we are not able to separate holders of small amounts of land from households with large holdings. Based on this index, households with the beneficiaries who continued in good standing appear to be less wealthy in terms of household assets than those in the comparison group and the group of beneficiaries who lost access to credit. Men and women in this group also appear to have lower levels of educational attainment and are less likely to be literate than the other two groups.

An individual's social capital and the availability of other groups in the community prior to baseline likely play a key role in her choice to participate in one of the programme's RUSACCOs. On average, the beneficiaries who continued in good standing are members of two to three groups and reported knowing of three to four mixed-gender or all-female groups in the communities at baseline. In contrast, on average, women in the comparison group and beneficiaries that lost access to credit reported knowing of only one to two mixed-gender or all-female groups in the community at baseline. In addition, prior to baseline, more beneficiaries who continued in good standing were members of a RUSACCO before 2016 than the other two groups. Overall, this suggests that the beneficiaries who continued in good standing have larger networks and potentially stronger ties to the community.

Table 2: Descriptive statistics of all women in Oromia at baseline

	Beneficiaries with access to credit through RUSACCO		Lost access to credit or left RUSACCO		Control		Difference	Normalized difference	Difference	Normalized difference
	(a) Mean	Std. Dev.	(b) Mean	Std. Dev.	(c) Mean	Std. Dev.	(a) – (c)	(a) – (c)	(b) – (c)	(b) – (c)
Age	39.52	10.35	40.40	11.26	38.68	11.70	0.84	0.05	1.72	0.11
Married	0.77	0.42	0.81	0.40	0.84	0.37	-0.07*	-0.12	-0.03	-0.06
Illiterate	0.75	0.43	0.73	0.44	0.68	0.47	0.07	0.11	0.05	0.08
Primary education or higher	0.26	0.44	0.31	0.46	0.35	0.48	-0.09*	-0.15	-0.04	-0.07
Number of children under 6 years	0.82	0.95	0.94	0.91	0.99	0.96	-0.17*	-0.13	-0.05	-0.03
Household size	5.96	2.15	6.08	2.40	6.10	2.30	-0.14	-0.05	-0.02	-0.01
Oromia wealth index	44.57	26.61	54.37	27.97	52.29	29.99	-7.72***	-0.19	2.08	0.05
Minutes to travel to nearest school	21.29	16.28	21.04	17.04	20.66	15.72	0.63	0.03	0.38	0.02
Household holds rights to land	0.78	0.41	0.84	0.37	0.81	0.39	-0.03	-0.04	0.03	0.06
Engages in cropping activities on the household farm	0.99	0.09	0.98	0.13	1.00	0.05	-0.01	-0.05	-0.01	-0.10
Engages in livestock activities on the household farm	0.98	0.13	0.95	0.22	0.95	0.23	0.04**	0.15	0.01	0.02
Engages in poultry activities on the household farm	0.65	0.48	0.61	0.49	0.60	0.49	0.05	0.08	0.01	0.02
Agriculture is the main employment	0.61	0.49	0.61	0.49	0.52	0.50	0.09*	0.13	0.09	0.13
Number of group memberships	2.11	1.25	1.59	0.88	1.49	1.05	0.63***	0.38	0.10	0.08
Member of a RUSACCO in 2015	0.67	0.47	0.47	0.50	0.23	0.42	0.44***	0.70	--0.24***	0.37
Number of female and mixed groups in the community	3.46	1.52	2.98	1.22	3.11	1.29	0.35**	0.17	-0.14	-0.08
Household face idiosyncratic shock	0.05	0.22	0.05	0.22	0.06	0.23	-0.00	-0.02	-0.01	-0.03
Household face agricultural shock	0.49	0.50	0.30	0.46	0.40	0.49	0.09*	0.12	-0.10*	-0.15
N	249		124		350		599	599	474	474

Source: Data from UNJP-RWEE impact evaluation study. Notes: They are significant at the * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Descriptive statistics of couple households in Oromia at baseline

	Beneficiaries with access to credit through RUSACCO		Lost access to credit or left RUSACCO		Control		Difference	Normalized difference	Difference	Normalized difference
	(a) Mean	Std. Dev.	(b) Mean	Std. Dev.	(c) Mean	Std. Dev.	(a) – (c)	(a) – (c)	(b) – (c)	(b) – (c)
Age (f)	37.95	9.05	37.70	10.36	36.43	10.45	1.52	0.11	1.27	0.09
Age (m)	44.07	10.97	42.11	11.49	42.72	13.22	1.35	0.08	-0.62	-0.04
Illiterate (f)	0.74	0.44	0.71	0.45	0.64	0.48	0.10*	0.16	0.07	0.11
Primary education or higher (f)	0.26	0.44	0.33	0.47	0.40	0.49	-0.13**	-0.20	-0.06	-0.09
Illiterate (m)	0.50	0.50	0.35	0.48	0.35	0.48	0.15**	0.22	0.00	0.00
Primary education or higher (m)	0.50	0.50	0.69	0.47	0.67	0.47	-0.17***	-0.25	0.02	0.03
Number of children under 6 years	0.90	0.95	1.04	0.91	1.13	0.96	-0.23*	-0.17	-0.10	-0.07
Household size	6.37	1.90	6.51	2.54	6.43	2.22	-0.06	-0.02	0.08	0.02
Oromia wealth index	45.51	25.83	56.14	27.19	53.30	31.00	-7.79**	-0.19	2.84	0.07
Minutes to travel to nearest school	20.72	16.66	23.17	18.89	21.17	16.44	-0.44	-0.02	2.00	0.08
Holds rights to land (f)	0.77	0.42	0.86	0.35	0.80	0.40	-0.03	-0.05	0.06	0.11
Holds rights to land (m)	0.75	0.43	0.86	0.35	0.79	0.41	-0.04	-0.06	0.07	0.12
Engages in cropping activities on the household farm (f)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Engages in livestock activities on the household farm (f)	0.99	0.08	0.99	0.11	0.96	0.19	0.03*	0.15	0.02	0.11
Engages in poultry activities on the household farm (f)	0.69	0.46	0.63	0.49	0.63	0.48	0.06	0.09	-0.00	-0.00
Engages in cropping activities on the household farm (m)	0.99	0.08	1.00	0.00	0.99	0.08	0.00	0.01	0.01	0.08
Engages in livestock activities on the household farm (m)	0.99	0.11	0.98	0.15	0.96	0.19	0.02	0.11	0.01	0.05
Engages in poultry activities on the household farm (m)	0.66	0.48	0.56	0.50	0.65	0.48	0.01	0.01	-0.09	-0.13
Agriculture is the main employment (f)	0.58	0.49	0.61	0.49	0.50	0.50	0.08	0.12	0.11	0.15
Number of group memberships (f)	2.18	1.28	1.58	0.87	1.41	0.98	0.77***	0.48	0.17	0.13
Member of a RUSACCO in 2015 (f)	0.71	0.45	0.48	0.50	0.24	0.43	0.47***	0.76	0.24***	0.36
Number of female and mixed groups in the community (f)	3.66	1.52	2.99	1.24	3.05	1.29	0.61***	0.31	-0.07	-0.04
Household face idiosyncratic shock	0.06	0.23	0.04	0.19	0.04	0.19	0.02	0.05	-0.00	-0.01
Household face agricultural shock	0.54	0.50	0.31	0.47	0.41	0.49	0.13**	0.19	-0.10	-0.14
N	163		84		281		444	444	365	365

Source: Data from UNJP-RWEE impact evaluation study. Notes: They are significant at the * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Tables 4 to 9 present the pro-WEAI indicators at baseline and midline in Oromia. Many of the women in both treatment groups (those beneficiaries who continued in good standing and those who lost access to credit) were already empowered at baseline. Overall, 88 percent of beneficiaries who continued in good standing, 86 percent of beneficiaries who lost access to credit, and 63 percent of women in the comparison sample achieved empowerment at baseline, based on a cutoff of 0.75 (because there are only 10 empowerment indicators, this means they achieved empowerment in at least 8 indicators). Similarly, the mean proportion of adequate indicators at baseline is 86 percent of beneficiaries who continued in good standing, 86 percent of beneficiaries that lost access to credit, and 63 percent for women in the comparison sample. Overall empowerment is measured using the pro-WEAI 3DE score, which takes into account the number of women who are empowered, the number who are disempowered, and the depth of their disempowerment (Malapit et al. 2019, Appendix B).[11] The pro-WEAI 3DE score ranges from zero to one, and a score closer to one means the individual is more empowered. At baseline, the measured 3DE scores are 0.96 for beneficiaries who continued in good standing, 0.95 for beneficiaries who lost access to credit, and 0.87 for women in the comparison sample.

For married women and men, the pro-WEAI scores are also based on a cutoff of 0.75, and this means the individual is empowered if he or she achieved empowerment in at least 9 of the 11 indicators, rather than 8 of 10. Empowerment values for married women are slightly lower since an additional empowerment indicator, respect among household members, is included, and fewer than half achieve empowerment in this indicator. Men across all three groups are generally empowered on par with women in the treatment group that continued in good standing.

Correspondingly, a larger share of couple households achieve gender parity at baseline and midline in the households where beneficiaries continued in good standing than in the comparison group. The Gender

[11] As explained in Malapit et al. (2019), 3DE = 1 - $\frac{1}{n}\sum_{i=1}^{n} c_i\,(k)$, where c_i(k) is the censored inadequacy score. It is equal to zero if the individual, *i,* of *n* individuals is empowered based on the disempowered cutoff, *k*, and equal to the inadequency score, c_i, when the individual is disempowered. The inadequency score $c_i = \sum_{j=1}^{m} w_j \times g_{ji}$, where $w_j = \frac{1}{m}$ is the weight for indicator *j*, *m* is the number of indicators, and g_{ji} is the inadequacy status of indicator *j* for individual *i*. g_{ji} is 1 if the indicator score is less than the cutoff and 0 if above the cutoff (Malapit et al. 2019).

Parity Index, which considers the empowerment gap between men and women within households and the number households that lack gender parity, ranges from zero to one. A score close to one means that women are as empowered as men in the same households. The Gender Parity index is 0.98 for households where beneficiaries continued in good standing, 0.98 for households where beneficiaries lost access to credit, and 0.94 for households in the comparison sample. There is a significant decrease at midline only for the households where beneficiaries lost access to credit. The final pro-WEAI score, which is a weighted average based on 90 percent from the 3DE score and 10 percent from the Gender Parity Index, is 0.91 for beneficiaries who continued in good standing, 0.90 for beneficiaries who lost access to credit, and 0.82 for women in the comparison sample, with little change between baseline and midline.

Considering the individual indicators in the index, at baseline, the majority of women in all three groups (those beneficiaries who continued in good standing, those who lost access to credit, and those in the comparison group) achieve empowerment in terms of both access to and decisions on financial services and group membership. As expected and based on our definition of the treatment groups, all beneficiaries who continued in good standing continue to achieve empowerment in terms of both access to and decisions on financial services and group membership. In the comparison group and the group of beneficiaries who lost access to credit, decreasing slightly for the comparison group and more substantially for the treatment group that lost access to credit or left the RUSACCO.

The high overall empowerment index scores at baseline appear to be primarily driven by these two indicators (access to credit and group membership) and by four of the other five instrumental agency indicators (input to productive decisions, control over use of income, and ownership of land or other assets, visiting important locations). The majority of women in all three groups (those beneficiaries who continued in good standing, those who lost access to credit, and those in the comparison group) achieve empowerment across these five indicators at baseline, with little change at midline across the three groups.

Of the instrumental agency indicators, women in all three groups are least likely to be empowered in terms of work balance, meaning that a substantial share of women work an average of 10.5 hours per day in paid and unpaid work. Men, on the other hand, are more likely to achieve empowerment in terms of work

balance across all three groups at baseline. Work balance appears to improve across the board for both men and women by midline, which may be due to the difference in the timing of the surveys. The baseline survey was administered during the harvest season and the midline was administered slightly later in the season, overlapping with fewer agricultural activities during the lean season.

Women and men in all three groups appear to be the least empowered in the three intrinsic agency indicators (autonomy in income, attitudes about intimate partner violence , and respect among household members) compared to the other dimensions. The proportion of those empowered in terms of autonomy over income decreases for both men and women in all three groups from baseline to midline. The decrease is greatest for women and men in the treatment group that lost access to credit. Men appear to be more empowered than women in terms of attitudes toward intimate partner violence . This finding corresponds with the aggregate estimates of men and women's attitudes toward intimate partner violence from other studies in GAAP2 (Malapit et al. 2019). While there is little change from baseline to midline in the number of empowered men and women in households with beneficiaries who continued in good standing, there is a decrease in the number of women and men who achieve empowerment in terms of attitudes toward intimate partner violence in households with beneficiaries who lost access to credit.

For married women and men, both in households with beneficiaries who continued in good standing and in the comparison group, there appears to be positive changes in terms of the indicator, respect among household members, from baseline to midline. These changes seem to be the greatest for married women and men in households with beneficiaries who continued in good standing. Empowerment in terms of respect among household members is measured by the respondent reporting respect for his or her spouse (or another household member) most of the time, perceives that his or her their spouse respects him or her in return most of the time, trusts that their spouse does things that are in their best interest most of the time, and feels comfortable disagreeing with his or her spouse There is little change from baseline to midline for both women and men in the households with beneficiaries who lost access to credit. Finally, there is a significant decrease for both men and women in terms of empowerment in membership in influential groups in the all three groups (those beneficiaries who continued in good standing, those who lost access to credit,

and those in the comparison group). The decrease is the greatest for beneficiaries who continued in good standing.

Table 4. Women's empowerment in Oromia at baseline based on Pro-WEAI indicators (full sample), differentiated by beneficiary and control households

		Beneficiaries with access to credit through RUSACCO		Lost access to credit or left RUSACCO		Control		Difference	Difference
Domain	Indicator	Mean (a)	Std. Dev.	Mean (b)	Std. Dev.	Mean (c)	Std. Dev.	(a) – (c)	(b) – (c)
Intrinsic agency	Autonomy in income	0.73	0.45	0.74	0.44	0.75	0.44	-0.02	-0.00
	Self-efficacy	-	-	-	-	-	-		
	Attitudes about intimate partner violence	0.64	0.48	0.64	0.48	0.57	0.50	0.07	0.07
	Respect among household members	-	-	-	-	-	-	-	
Instrumental agency	Input in productive decisions	1.00	0.06	0.98	0.13	0.97	0.16	0.02*	0.01
	Ownership of land and other assets	1.00	0.06	1.00	0.00	1.00	0.05	0.00	0.00
	Access to and decisions on financial services	1.00	0.00	1.00	0.00	0.93	0.25	0.07***	0.07***
	Control over use of income	0.98	0.14	0.98	0.15	0.94	0.24	0.04**	0.04*
	Work balance	0.43	0.50	0.52	0.50	0.43	0.50	0.00	0.10
	Visiting important locations	0.95	0.21	0.91	0.29	0.89	0.31	0.06**	0.02
Collective agency	Group membership	0.98	0.13	0.97	0.18	0.80	0.40	0.18***	0.16***
	Membership in influential groups	0.85	0.36	0.73	0.45	0.55	0.50	0.30***	0.17***
Number of observations		249		124		350		599	474
Mean proportion of adequate indicators		0.86	0.09	0.85	0.11	0.78	0.14	0.07***	0.06***
3DE score (the sum of the share empowered and the average adequacy score of the disempowered weighted by the share of the disempowered)		0.96		0.95		0.87			
Disempowerment score (1 – 3DE)		0.04		0.05		0.13			
% achieving empowerment		0.88	0.33	0.86	0.35	0.63	0.48	0.24***	0.23***
% not achieving empowerment		0.12		0.14		0.37			
Mean 3DE score for not yet empowered		0.68		0.64		0.64			
Mean disempowerment score (1 – 3DE)		0.32		0.36		0.36			

Source: Data from UNJP-RWEE impact evaluation study. Notes: Ten of the 12 indicators are used to measure the Pro-WEAI scores. The self-efficacy module was not included in the survey. Respect among household members is excluded because of the missing observations in the sample with both married and unmarried women. Each of the 10 indicators are weighted equally in the scores. The pro-WEAI scores in the study are based on an inadequacy cutoff set at 0.75.

Table 5. Married women's empowerment in couple households in Oromia at baseline based on Pro-WEAI indicators, differentiated by beneficiary and control households

		Beneficiaries with access to credit		Lost access to credit or left RUSACCO		Control		Difference	Difference
Domain	Indicator	Mean (a)	Std. Dev.	Mean (b)	Std. Dev.	Mean (c)	Std. Dev.	(a) – (c)	(b) – (c)
Intrinsic agency	Autonomy in income	0.74	0.44	0.69	0.47	0.74	0.44	0.00	-0.05
	Self-efficacy	-	-	-	-	-	-		
	Attitudes about intimate partner violence	0.66	0.47	0.63	0.49	0.56	0.50	0.11*	0.08
	Respect among household members	0.45	0.50	0.45	0.50	0.50	0.50	-0.04	-0.05
Instrumental agency	Input in productive decisions	0.99	0.08	0.99	0.11	0.98	0.14	0.02	0.01
	Ownership of land and other assets	0.99	0.08	1.00	0.00	1.00	0.06	0.00	0.00
	Access to and decisions on financial services	1.00	0.00	1.00	0.00	0.93	0.26	0.07***	0.07***
	Control over use of income	0.97	0.17	0.99	0.11	0.95	0.22	0.02	0.04*
	Work balance	0.36	0.48	0.49	0.50	0.37	0.48	0.00	0.12
	Visiting important locations	0.94	0.23	0.93	0.26	0.89	0.31	0.05*	0.04
Collective agency	Group membership	0.99	0.11	0.96	0.19	0.80	0.40	0.19***	0.17***
	Membership in influential groups	0.82	0.39	0.68	0.47	0.54	0.50	0.28***	0.14*
Number of observations		163		84		281		444	365
Mean proportion of adequate indicators		0.81	0.10	0.80	0.11	0.75	0.13	0.06***	0.05***
3DE score (the sum of the share empowered and the average adequacy score of the disempowered weighted by the share of the disempowered)		0.90		0.90		0.81			
Disempowerment score (1 – 3DE)		0.10		0.10		0.19			
% achieving empowerment		0.68	0.47	0.68	0.47	0.43	0.50	0.25***	0.24***
% not achieving empowerment		0.32		0.32		0.57			
Mean 3DE score for not yet empowered		0.69		0.68		0.66			
Mean disempowerment score (1 – 3DE)		0.31		0.32		0.34			
Gender Parity Index (GPI)		0.98		0.98		0.94			
% achieving gender parity		0.77		0.81		0.54			
% not achieving gender parity		0.23		0.19		0.46			
Average empowerment gap		0.08		0.13		0.12			
Pro-WEAI score		0.91		0.90		0.82			

Source: Data from UNJP-RWEE impact evaluation study. Notes: Eleven of the 12 indicators are used to measure the pro-WEAI scores. The self-efficacy module was not included in the survey. Each of the 11 indicators are weighted equally in the scores. The pro-WEAI scores in the study are based on an inadequacy cutoff set at 0.75.

Table 6. Married men's empowerment in couple households in Oromia at baseline based on Pro-WEAI indicators, differentiated by beneficiary and control households

		Beneficiaries with access to credit through RUSACCO		Lost access to credit or left RUSACCO		Control		Difference	Difference
Domain	Indicator	Mean (a)	Std. Dev.	Mean (b)	Std. Dev.	Mean (c)	Std. Dev.	(a) – (c)	(b) – (c)
Intrinsic agency	Autonomy in income	0.76	0.43	0.70	0.46	0.79	0.41	-0.03	-0.08
	Self-efficacy	-	-	-	-	-	-	-	-
	Attitudes about intimate partner violence	0.78	0.42	0.79	0.41	0.75	0.43	0.03	0.03
	Respect among household members	0.58	0.49	0.61	0.49	0.67	0.47	-0.08	-0.06
Instrumental agency	Input in productive decisions	0.94	0.24	0.93	0.26	0.89	0.31	0.05	0.04
	Ownership of land and other assets	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
	Access to and decisions on financial services	0.99	0.08	0.99	0.11	0.95	0.22	0.04**	0.04*
	Control over use of income	0.83	0.37	0.82	0.39	0.80	0.40	0.04	0.02
	Work balance	0.71	0.46	0.83	0.37	0.84	0.37	-0.13**	-0.01
	Visiting important locations	0.93	0.26	0.93	0.26	0.93	0.26	0.00	0.00
Collective agency	Group membership	0.89	0.31	0.85	0.36	0.86	0.35	0.03	-0.01
	Membership in influential groups	0.65	0.48	0.63	0.49	0.65	0.48	0.00	-0.02
Number of observations		163		84		281		444	365
Mean proportion of adequate indicators		0.82	0.10	0.82	0.11	0.83	0.11	-0.01	0.00
3DE score (the sum of the share empowered and the average adequacy score of the disempowered weighted by the share of the disempowered)		0.90		0.90		0.91			
Disempowerment score (1 – 3DE)		010		0.10		0.09			
% achieving empowerment		0.66	0.47	0.69	0.47	0.73	0.44	-0.07	-0.04
% not achieving empowerment		0.34		0.31		0.27			
Mean 3DE score for not yet empowered		0.70		0.69		0.68			
Mean disempowerment score (1 – 3DE)		0.30		0.31		0.32			

Source: Data from UNJP-RWEE impact evaluation study. Notes: Eleven of the 12 indicators are used to measure the Pro-WEAI scores. The self-efficacy module was not included in the survey. Each of the 11 indicators are weighted equally in the scores. The pro-WEAI scores in the study are based on an inadequacy cutoff set at 0.75.

Table 7. Women's empowerment in Oromia at midline based on Pro-WEAI indicators (full sample), differentiated by beneficiary and control households

		Beneficiaries with access to credit through RUSACCO		Lost access to credit or left RUSACCO		Control		Difference	Difference
Domain	Indicator	Mean (a)	Std. Dev.	Mean (b)	Std. Dev.	Mean (c)	Std. Dev.	(a) – (c)	(b) – (c)
Intrinsic agency	Autonomy in income	0.62	0.49	0.37	0.49	0.57	0.50	0.04	-0.20***
	Self-efficacy	-	-	-	-	-	-		
	Attitudes about intimate partner violence	0.65	0.48	0.51	0.50	0.63	0.48	0.02	-0.12*
	Respect among household members	-	-	-	-	-	-	-	-
Instrumental agency	Input in productive decisions	0.99	0.11	0.95	0.22	0.97	0.18	0.02	-0.01
	Ownership of land and other assets	1.00	0.06	0.99	0.09	0.99	0.11	0.01	0.00
	Access to and decisions on financial services	1.00	0.00	0.73	0.44	0.90	0.30	0.10***	-0.16***
	Control over use of income	0.99	0.11	0.98	0.15	0.98	0.14	0.01	-0.00
	Work balance	0.62	0.49	0.58	0.50	0.62	0.49	0.00	-0.04
	Visiting important locations	0.94	0.25	0.91	0.29	0.88	0.33	0.06*	0.03
Collective agency	Group membership	1.00	0.00	0.70	0.46	0.73	0.44	0.27***	-0.03
	Membership in influential groups	0.53	0.50	0.46	0.50	0.40	0.49	0.14***	0.06
Number of observations		249		124		350		599	474
Mean proportion of adequate indicators		0.83	0.11	0.72	0.15	0.77	0.15	0.07***	-0.05**
3DE score (the sum of the share empowered and the average adequacy score of the disempowered weighted by the share of the disempowered)		0.92		0.78		0.85			
Disempowerment score (1 – 3DE)		0.08		0.22		0.15			
% achieving empowerment		0.75	0.44	0.44	0.50	0.60	0.49	0.15***	-0.16**
% not achieving empowerment		0.25		0.56		040			
Mean 3DE score for not yet empowered		0.68		0.61		0.62			
Mean disempowerment score (1 – 3DE)		0.32		0.39		0.38			

Source: Data from UNJP-RWEE impact evaluation study. Notes: Ten of the 12 indicators are used to measure the Pro-WEAI scores. The self-efficacy module was not included in the survey. Respect among household members is excluded because of the missing observations in the sample with both married and unmarried women. Each of the 10 indicators are weighted equally in the scores. The pro-WEAI scores in the study are based on an inadequacy cutoff set at 0.75.

Table 8. Married women's empowerment in couple households in Oromia at mid-line based on Pro-WEAI indicators, differentiated by beneficiary and control households

		Beneficiaries with access to credit through RUSACCO		Lost access to credit or left RUSACCO		Control		Difference	Difference
Domain	Indicator	Mean (a)	Std. Dev.	Mean (b)	Std. Dev.	Mean (c)	Std. Dev.	(a) – (c)	(b) – (c)
Intrinsic agency	Autonomy in income	0.64	0.48	0.33	0.47	0.57	0.50	0.07	-0.24***
	Self-efficacy			-	-	-	-		
	Attitudes about intimate partner violence	0.63	0.48	0.43	0.50	0.63	0.48	0.01	-0.20**
	Respect among household members	0.72	0.45	0.46	0.50	0.56	0.50	0.16***	-0.10
Instrumental agency	Input in productive decisions	0.99	0.08	0.96	0.19	0.96	0.19	0.03*	0.00
	Ownership of land and other assets	1.00	0.00	1.00	0.00	0.99	0.10	0.01	0.01
	Access to and decisions on financial services	1.00	0.00	0.75	0.44	0.89	0.31	0.11***	-0.14**
	Control over use of income	0.99	0.08	0.98	0.15	0.98	0.14	0.02	0.00
	Work balance	0.59	0.49	0.52	0.50	0.58	0.49	0.01	-0.06
	Visiting important locations	0.91	0.29	0.93	0.26	0.90	0.30	0.00	0.02
Collective agency	Group membership	1.00	0.00	0.69	0.47	0.73	0.44	0.27***	-0.04
	Membership in influential groups	0.45	0.50	0.48	0.50	0.40	0.49	0.05	0.07
Number of observations		163		84		281		444	365
Mean proportion of adequate indicators		0.81	0.11	0.69	0.15	0.75	0.15	0.07***	-0.06**
3DE score (the sum of the share empowered and the average adequacy score of the disempowered weighted by the share of the disempowered)		0.89		0.72		0.81			
Disempowerment score (1 – 3DE)		0.11		0.28		0.19			
% achieving empowerment		0.64	0.48	0.29	0.45	0.47	0.50	0.17***	-0.18**
% not achieving empowerment		0.36		0.71		0.53			
Mean 3DE score for not yet empowered		0.69		0.61		0.64			
Mean disempowerment score (1 – 3DE)		0.31		0.39		0.36			
Gender Parity Index (GPI)		0.99		0.92		0.94			
% achieving gender parity		0.80		0.52		0.63			
% not achieving gender parity		0.20		0.48		0.37			
Average empowerment gap		0.06		0.17		0.15			
Pro-WEAI score		0.90		0.74		0.82			

Source: Data from UNJP-RWEE impact evaluation study. Notes: Eleven of the 12 indicators are used to measure the Pro-WEAI scores. The self-efficacy module was not included in the survey. Each of the 11 indicators are weighted equally in the scores. The pro-WEAI scores in the study are based on an inadequacy cutoff set at 0.75.

Table 9. Married men's empowerment in couple households in Oromia at mid-line based on Pro-WEAI indicators, differentiated by beneficiary and control households

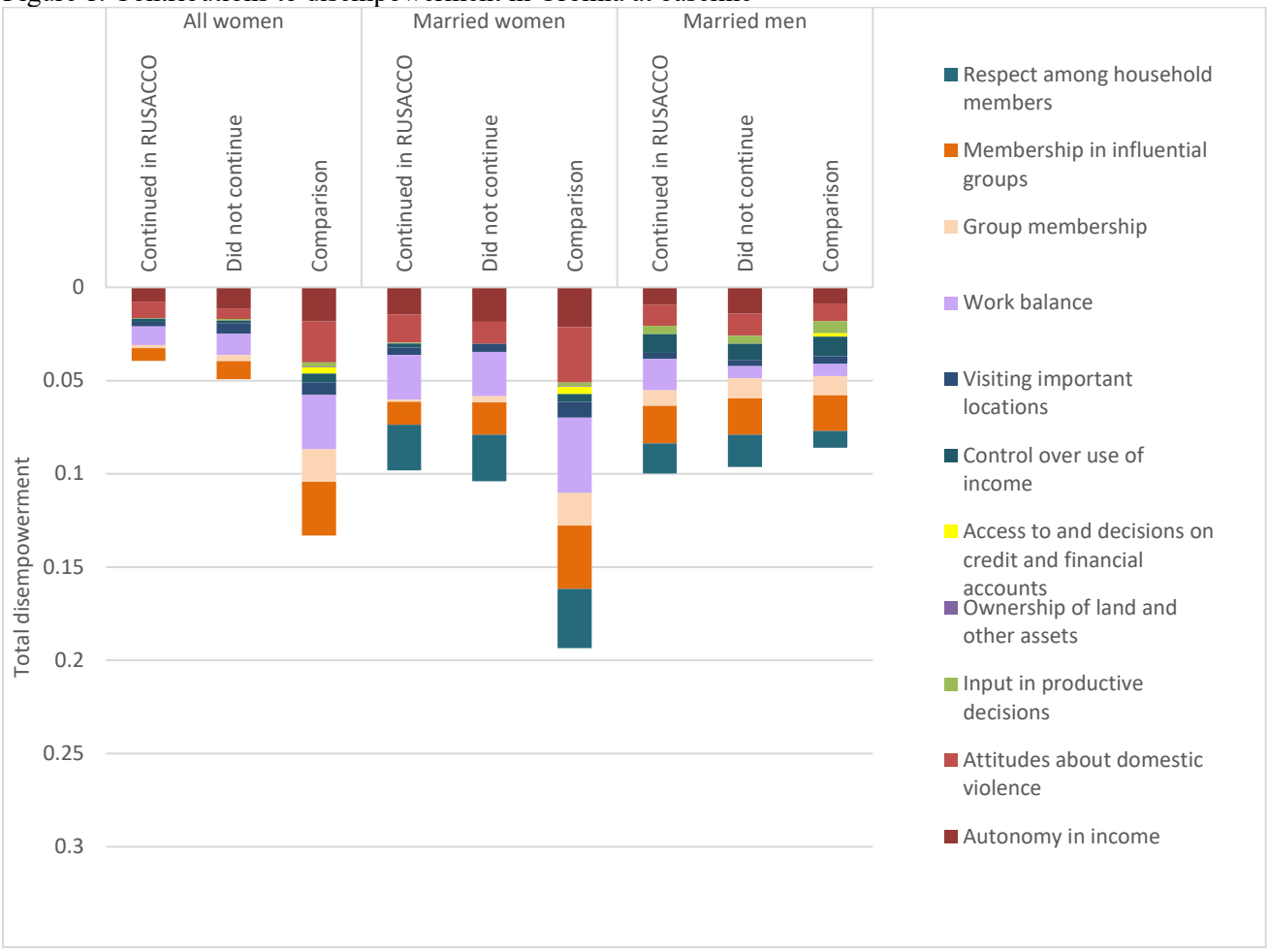
		Beneficiaries with access to credit through RUSACCO		Lost access to credit or left RUSACCO		Control		Difference	Difference
Domain	Indicator	Mean (a)	Std. Dev.	Mean (b)	Std. Dev.	Mean (c)	Std. Dev.	(a) – (c)	(b) – (c)
Intrinsic agency	Autonomy in income	0.66	0.48	0.32	0.47	0.53	0.50	0.13**	-0.21***
	Self-efficacy	-	-	-	-	-	-		
	Attitudes about intimate partner violence	0.74	0.44	0.55	0.50	0.70	0.46	0.04	-0.15*
	Respect among household members	0.79	0.41	0.60	0.49	0.73	0.44	0.06	-0.13*
Instrumental agency	Input in productive decisions	0.96	0.20	0.95	0.21	0.96	0.19	0.00	-0.01
	Ownership of land and other assets	1.00	0.00	1.00	0.00	1.00	0.06	0.00	0.00
	Access to and decisions on financial services	0.98	0.13	0.77	0.42	0.88	0.32	0.10***	-0.11*
	Control over use of income	0.94	0.24	0.92	0.28	0.95	0.21	-0.02	-0.04
	Work balance	0.94	0.24	0.83	0.37	0.90	0.30	0.03	-0.07
	Visiting important locations	0.83	0.38	0.93	0.26	0.86	0.35	-0.03	0.07
Collective agency	Group membership	0.88	0.32	0.67	0.47	0.84	0.37	0.04	-0.17**
	Membership in influential groups	0.33	0.47	0.46	0.50	0.49	0.50	-0.16***	-0.03
Number of observations		163		84		281		444	365
Mean proportion of adequate indicators		0.82	0.12	0.73	0.15	0.80	0.13	0.02	-0.08***
3DE score (the sum of the share empowered and the average adequacy score of the disempowered weighted by the share of the disempowered)		0.90		0.79		0.87			
Disempowerment score (1 – 3DE)		0.10		0.21		0.13			
% achieving empowerment		0.71	0.46	0.44	0.50	0.62	0.49	0.09	-0.18**
% not achieving empowerment		0.29		0.56		0.38			
Mean 3DE score for not yet empowered		0.67		0.63		0.67			
Mean disempowerment score (1 – 3DE)		0.3		0.37		0.33			

Source: Data from UNJP-RWEE impact evaluation study. Notes: Eleven of the 12 indicators are used to measure the pro-WEAI scores. The self-efficacy module was not included in the survey. Each of the 11 indicators are weighted equally in the scores. The pro-WEAI scores in the study are based on an inadequacy cutoff set at 0.75.

Figures 1 and 2 disaggregate the 3DE score into the contributions to disempowerment in Oromia at baseline and midline across the groups and by sex. The figures confirm that the largest contributors to disempowerment for women in both beneficiary and comparison samples are the intrinsic agency indicators, the work balance indicator in the instrumental agency domain, and membership in influential groups in the collective agency domain. What is interesting to note here is that disempowerment deepens

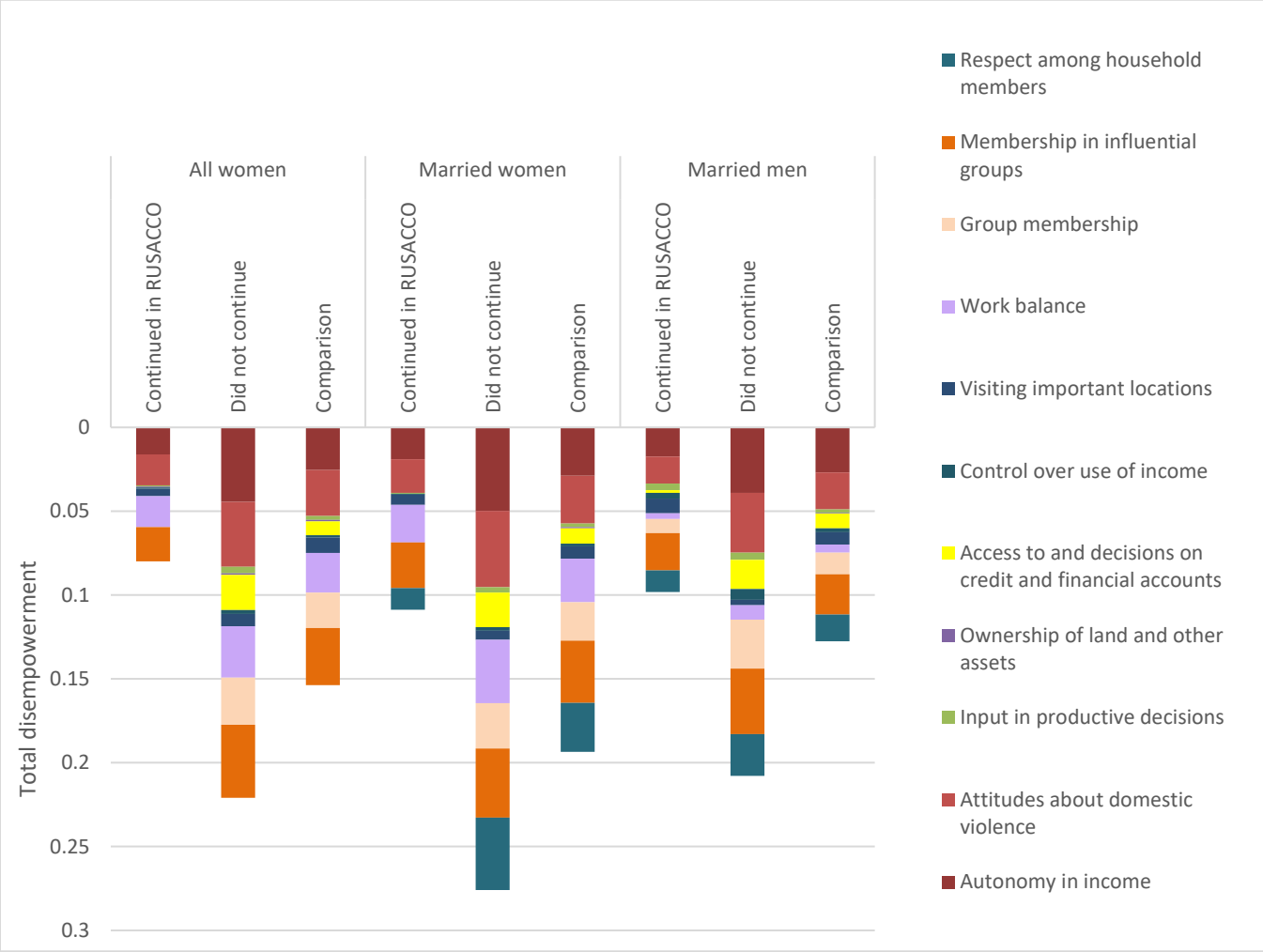
for women and men in all three groups (those beneficiaries who continued in good standing, those who lost access to credit, and those in the comparison group) between baseline and midline, but deepens the most for the women and men in the group of beneficiaries who lost access to credit. It may be due to external factors (such as internal conflict, loss of crops due to pests, and lower than normal rainfall) impacting households in these communities, and in turn impacting their empowerment. However, households with beneficiaries that continued in good standing were more resilient and, in turn, maintained higher levels of empowerment.

Figure 1. Contributions to disempowerment in Oromia at baseline



Source: Data from UNJP-RWEE impact evaluation study.

Figure 2. Contributions to disempowerment in Oromia at midline



Source: Data from UNJP-RWEE impact evaluation study.

4.2 Afar

In Afar, the midline data includes some recall questions, which can be used to construct baseline indicators. The descriptive statistics are presented in Tables 10 and 11. At the start of the project, the average age of women in the beneficiary and comparison samples is around 30 years. The majority of women at baseline are married, households have between five and six members, and a large proportion of women in both groups report participating in raising large and small livestock. However, a clear difference is evident between the beneficiary and comparison samples in their engagement in cropping activities. The majority of the beneficiaries are nomadic pastoralists and are not engaged in cropping activities, although this is not

captured directly in our data. On the other hand, women in the comparison communities are more likely to report participating in cropping activities on the household farm and are much more likely to hold rights over land than women in the beneficiary group. A wealth index for Afar was created from the dwelling characteristics and household asset ownership (see Appendix A). Like in Oromia, the index excludes land held. Based on this index, households in the beneficiary group seem to hold greater wealth in assets than those in the comparison group. Women in the comparison group also individual or jointly own more assets than those in the beneficiary group at baseline. Group membership is minimal for both the beneficiaries and the comparison group at baseline.

Table 10. Descriptive statistics of all women in Afar households

	Beneficiary		Control		Difference	Normalized difference
	Mean (a)	Std. Dev.	Mean (b)	Std. Dev.	(a) – (b)	(a)-(b)
Age at baseline	31.48	10.07	32.81	11.74	-1.34	-0.09
Married before 2016	0.79	0.41	0.76	0.43	0.03	0.05
Illiterate	0.90	0.30	0.93	0.26	-0.03	-0.07
Primary education or higher	0.07	0.25	0.06	0.23	0.01	0.04
Number of children under 6 years in 2016	1.13	1.08	1.12	1.26	0.01	0.01
Minutes to travel to nearest school	24.02	35.03	28.57	30.36	-4.55	-0.10
Household size in 2016	5.05	2.02	5.00	2.21	0.05	0.02
Afar wealth index	61.46	27.27	34.90	25.43	26.57***	0.71
Rights over land in 2016	0.02	0.11	0.68	0.47	-0.66***	-1.38
Number of major assets owned in 2016	3.19	1.06	3.71	1.03	0.52***	-0.42
Engages in cropping activities in 2016	0.01	0.11	0.47	0.50	-0.46***	-0.89
Engages in livestock activities in 2016	0.72	0.45	0.67	0.47	0.05	0.07
Engages in non-farm self-employment activities in 2016	0.09	0.29	0.03	0.17	0.06**	0.19
Engages in wage and salary work in 2016	0.26	0.44	0.26	0.44	-0.01	-0.01
Number of group memberships in 2016	0.14	0.42	0.01	0.10	0.13***	0.31
N	237		198		435	435

Source: Data from UNJP-RWEE impact evaluation study. Notes: They are significant at the * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11. Descriptive statistics of married women in Afar households

	Beneficiary		Control		Difference	Normalized difference
	Mean (a)	Std. Dev.	Mean (b)	Std. Dev.	(a) – (b)	
Age at baseline	30.66	8.93	30.36	9.53	0.30	0.02
Married before 2016	0.97	0.16	0.92	0.27	0.05*	0.17
Illiterate	0.93	0.26	0.93	0.26	-0.00	-0.00
Primary education or higher	0.05	0.23	0.06	0.24	-0.01	-0.02
Number of children under 6 years in 2016	1.22	1.08	1.27	1.29	-0.04	-0.03
Minutes to travel to nearest school	24.18	32.64	28.60	30.44	-4.43	-0.10
Household size in 2016	5.30	1.98	5.24	2.22	0.07	0.02
Afar wealth index	59.63	27.23	35.62	24.86	24.01***	0.65
Rights over land in 2016	0.02	0.13	0.74	0.44	-0.72***	-1.57
Number of major assets owned in 2016	3.28	1.02	3.83	1.00	0.55***	-0.39
Engages in cropping activities in 2016	0.02	0.13	0.51	0.50	-0.50***	-0.96
Engages in livestock activities in 2016	0.71	0.46	0.65	0.48	0.05	0.08
Engages in non-farm self-employment activities in 2016	0.09	0.28	0.02	0.15	0.06*	0.19
Engages in wage and salary work in 2016	0.25	0.43	0.26	0.44	-0.01	-0.02
Number of group memberships in 2016	0.11	0.37	0.01	0.11	0.10***	0.24
N	187		164		351	351

Source: Data from UNJP-RWEE impact evaluation study. Notes: They are significant at the * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Women in the Afar sample are much less empowered than women in the Oromia sample (Tables 12 and 13). The majority of women in the Afar sample do not achieve empowerment. In addition, there are substantial differences in empowerment between women in the beneficiary and comparison samples. Only one percent of women in the comparison sample achieve empowerment at midline, compared to 31 percent of women in the beneficiary group (Table 12). The mean proportion of adequate indicators is 0.67 for women in the beneficiary sample and 0.49 for women in the comparison sample. The pro-WEAI 3DE score is 0.70 for all women in the beneficiary sample and 0.49 for all women in the comparison sample. With the exception of the percentage empowered, these estimates only change slightly for the two groups when the sample is restricted to married women only (Table 13).

As expected, and based on the nature of the interventions, the majority of beneficiaries in Afar are empowered in terms of group membership and access to and decisions over credit at midline. Substantially

more beneficiaries are empowered in these two indicators and in membership in influential groups than women in the comparison communities. Beyond the access to and decisions over credit, group membership, and membership in influential groups—like in Oromia, women from both groups seem to be the least empowered in the indicators of intrinsic agency and work balance.

Table 12. Women's empowerment in Afar at mid-line based on Pro-WEAI indicators, differentiated by beneficiary and control households

		Women				
		Beneficiary		Control		Difference
Domain	Indicator	Mean (a)	Std. Dev.	Mean (b)	Std. Dev.	(a) – (b)
Intrinsic agency	Autonomy in income	0.45	0.50	0.52	0.50	-0.07
	Self-efficacy	-	-	-	-	
	Attitudes about intimate partner violence	0.40	0.49	0.37	0.49	0.02
	Respect among household members	-	-	-	-	
Instrumental agency	Input in productive decisions	0.86	0.35	0.89	0.32	-0.03
	Ownership of land and other assets	0.74	0.44	0.95	0.22	-0.21***
	Access to and decisions on financial services	0.76	0.43	0.24	0.43	0.52***
	Control over use of income	0.95	0.22	0.85	0.36	0.10***
	Work balance	0.48	0.50	0.47	0.50	0.01
	Visiting important locations	0.81	0.39	0.60	0.49	0.22***
Collective agency	Group membership	0.89	0.32	0.03	0.16	0.86***
	Membership in influential groups	0.40	0.49	0.00	0.00	0.40***
Number of observations		237		198		
Mean proportion of adequate indicators		0.67	0.14	0.49	0.13	0.18***
3DE score		0.72		0.49		
Disempowerment score (1 – 3DE)		0.28		0.51		
% achieving empowerment		0.31	0.46	0.01	0.10	0.30***
% not achieving empowerment		0.69		0.99		
Mean 3DE score for not yet empowered		0.60		0.49		
Mean disempowerment score (1 – 3DE)		0.40		0.51		435

Source: Data from UNJP-RWEE impact evaluation study. Notes: Ten of the 12 indicators are used to measure the Pro-WEAI scores. The self-efficacy module was not included in the survey. Respect among household members is excluded because of the missing observations in the sample with both married and unmarried women. Each of the 10 indicators are weighted equally in the scores. The pro-WEAI scores in the study are based on an inadequacy cutoff set at 0.75.

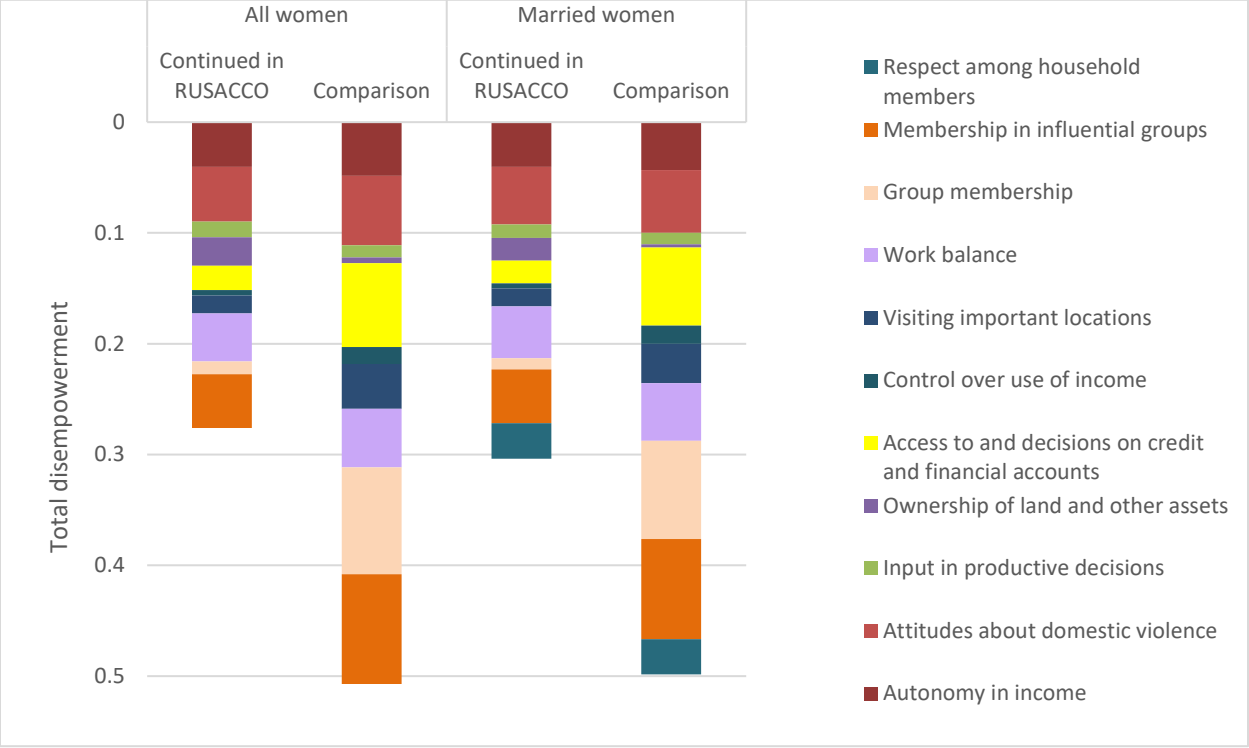
Table 13. Married women's empowerment in Afar at mid-line based on Pro-WEAI indicators, differentiated by beneficiary and control households

		Married women				
		Beneficiary		Control		Difference
Domain	Indicator	Mean (a)	Std. Dev.	Mean (b)	Std. Dev.	(a) – (b)
Intrinsic agency	Autonomy in income	0.45	0.50	0.52	0.50	-0.07
	Self-efficacy	-	-	-	-	
	Attitudes about intimate partner violence	0.39	0.49	0.38	0.49	0.01
	Respect among household members	0.63	0.48	0.65	0.48	-0.02
Instrumental agency	Input in productive decisions	0.87	0.34	0.88	0.32	-0.02
	Ownership of land and other assets	0.78	0.42	0.97	0.17	-0.19***
	Access to and decisions on financial services	0.76	0.43	0.23	0.42	0.54***
	Control over use of income	0.95	0.23	0.82	0.39	0.13***
	Work balance	0.44	0.50	0.43	0.50	0.01
	Visiting important locations	0.81	0.40	0.61	0.49	0.20***
Collective agency	Group membership	0.89	0.32	0.02	0.13	0.87***
	Membership in influential groups	0.37	0.49	0.00	0.00	0.37***
Number of observations		187		164		351
Mean proportion of adequate indicators		0.67	0.13	0.50	0.14	0.17***
3DE score		0.70		0.50		
Disempowerment score (1 – 3DE)		0.30		0.50		
% achieving empowerment		0.20	0.40	0.01	0.08	0.19***
% not achieving empowerment		0.80		0.99		
Mean 3DE score for not yet empowered		0.62		0.50		
Mean disempowerment score (1 – 3DE)		0.38		0.50		

Source: Data from UNJP-RWEE impact evaluation study. Notes: Eleven of the 12 indicators are used to measure the Pro-WEAI scores. The self-efficacy module was not included in the survey. Each of the 11 indicators are weighted equally in the scores. The pro-WEAI scores in the study are based on an inadequacy cutoff set at 0.75.

Figure 3 disaggregates the 3DE score into the contributions to disempowerment in Afar. For women in the beneficiary sample, attitudes about intimate partner violence , membership in influential groups, and work balance are the greatest contributors to disempowerment. For women in the comparison sample, the three largest contributors of disempowerment are membership in influential groups, group membership, and access to and decisions over credit. These are followed by attitudes toward intimate partner violence and work balance.

Figure 3. Contributions to disempowerment in Afar at midline



Source: Data from UNJP-RWEE impact evaluation study.

5 Empirical framework

The impact of UNJP-RWEE on empowerment is measured using indicators and sub-indicators within the pro-WEAI. In Oromia, our empirical strategy is to use a difference-in-difference estimator to account for time invariant differences between the treatment and comparison groups, with Inverse Probability Weighting (IPW) following Hirano et al. (2003). This approach has recently been used in agricultural (Alem & Broussard, 2018) and in development economics studies (Busso et al., 2013) and will help remove any effect of differential sampling between the beneficiary and comparison groups. The estimated propensity scores, p, which is the probability of being in the treatment group based on observed characteristics, are used to create the weights. Given that assignment to the treatment group is non-random, the propensity score weights, which match individuals in the treatment group to individuals in the comparison group, help to eliminate selection bias and to ensure greater comparability between the groups

(Rosenbaum & Rubin, 1983). The beneficiary respondents are weighted with 1/p, and the respondents in the comparison group are each weighted with 1/1-p, so that the weights will be small when the probability of being in the treatment group is high and large when the probability of being in the treatment group is low. The propensity scores are estimated with the data at baseline using a probit estimation:

$$p(\boldsymbol{x}_{bi}, \boldsymbol{n}_{\boldsymbol{i}}) = \Pr(D_i = 1 | \boldsymbol{x}_{bi}, \boldsymbol{n}_{\boldsymbol{i}}), \quad (1)$$

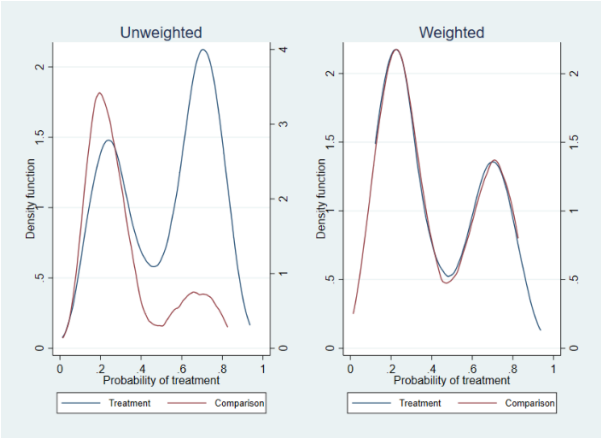
where the probability of being in the treated group, D, is based on a set of observable characteristics, $\boldsymbol{x}$ is a vector of individual and household characteristics of individual, i, at baseline, b, and $\boldsymbol{n}$ are the woredas. For the probit estimation, we estimate treatment using the following baseline characteristics: age, household demographics, marital status, educational attainment, wealth index, land holdings, household distance from services (minutes to commute to a primary school), and participation in agriculture on the household farm as the primary income earning activity. These could conceivably have influenced the probability of being selected for participation in the programme. While the comparison communities were selected with a focus on establishing a good counterfactual, we note large differences in social capital between the two groups. Since social capital is closely related to participation in the UNJP-RWEE, controlling for these characteristics should help avoid bias due to differences that may have prompted women to participate in the RUSACCO. The membership in a RUSACCO in or prior to 2015 also takes into account that the RUSACCOs were established before the baseline survey and that the first participants likely had earlier access to credit through these organizations. Conflict in the area heavily impacted some households prior to the baseline survey. Additionally, repercussions from the 2015-2016 El Niño drought and continued changing weather patterns, as well as a pest infestation in 2016-2017, impacted a number of crops. These shocks may impact individuals' participation in a RUSACCO or microfinance institution and households' demand for credit. To control for this, the illness or death of a family member or someone that the household relies heavily on for their well-being prior to baseline is included as a proxy for a household being impacted by the conflict. The loss of crops or livestock due to widespread disease or lower than average rainfall in

the community prior to baseline is included as a proxy for a household being impacted by natural events. Additionally, we include woreda fixed effects. We estimate the propensity scores for the full female sample, married women, and married men for the two treatment groups separately. The estimates for married women and men also include the age, education, and land holdings of both spouses.

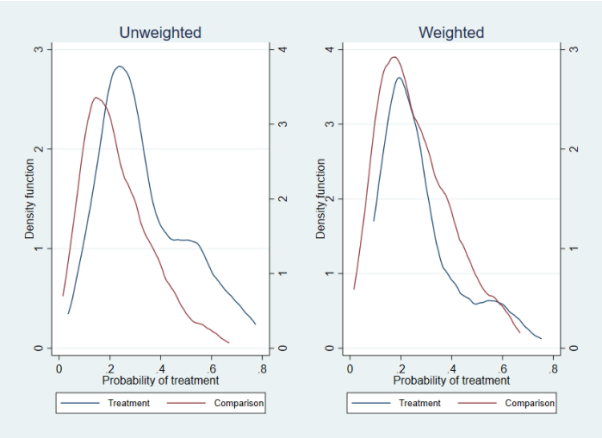
The six probit estimation results with the average marginal (partial) effects are presented in Appendix B. The social capital variables have the expected signs and respondent membership of a RUSACCO prior to baseline is significant across the groups. The education variables are also significant for beneficiaries who continued in good standing at midline. Households in the treatment group of beneficiaries who lost access to credit were less likely to live in Yaya Gulele and more likely to be employed in agriculture as the main form of employment.

We check the suitability of the weights by looking at the propensity score distributions with and without weights, presented in Figure 4. The graphs on the left in each figure show the distribution of the propensity scores without weights and the extent to which the distributions between the beneficiary group and comparison group overlap. The graphs on the right show the distribution of propensity scores with the weights. The figures suggest that the weighting leads to a more similar distribution of propensity scores among the different beneficiary and comparison groups.

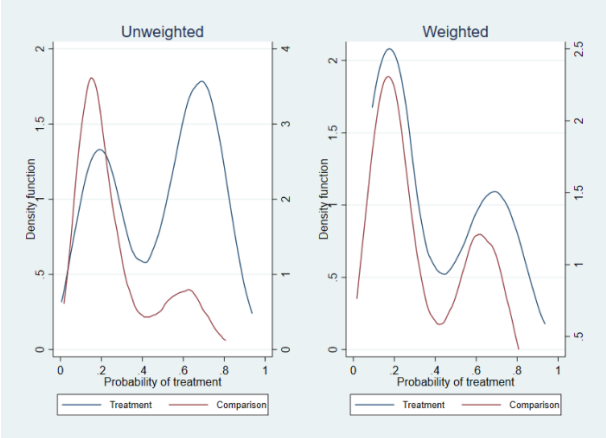
Figure 4. Propensity score distributions with and without weights for Oromia samples



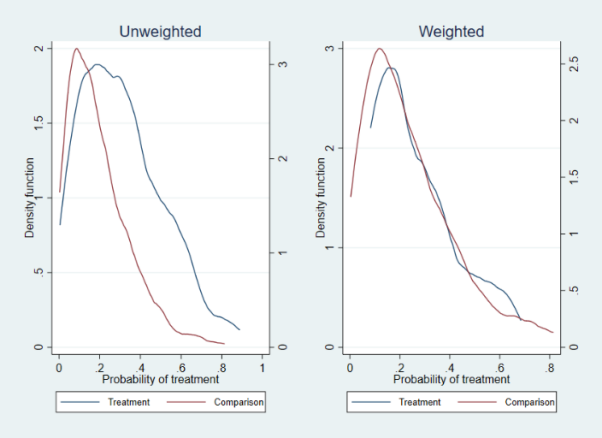
All women who continued in the RUSACCO compared to control



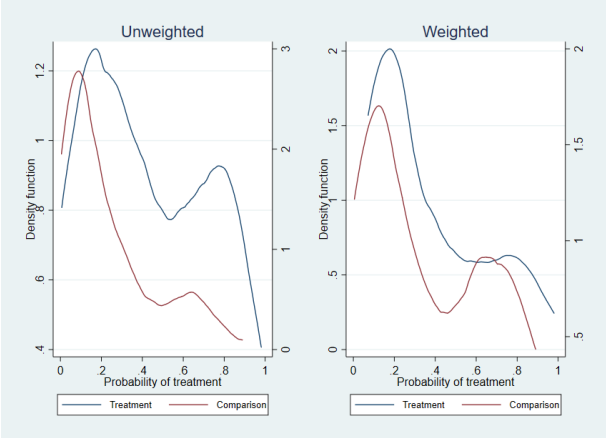
All women who did not continue in RUSACCO compared to control



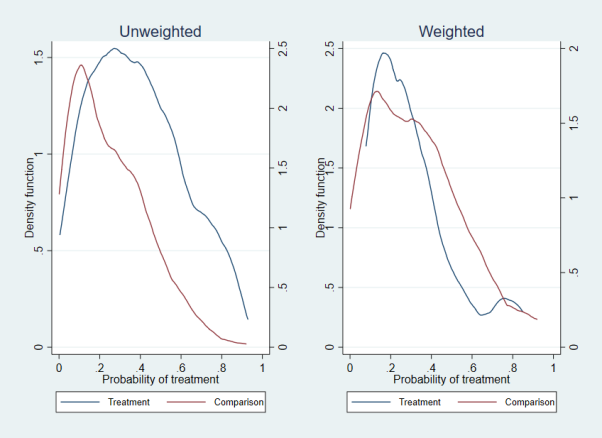
Married women who continued in the RUSACCO compared to control



Married women who did not continue in RUSACCO compared to control



Married women who continued in the RUSACCO compared to control



Married men who did not continue in RUSACCO compared to control

Source: Data from UNJP-RWEE impact evaluation study.

Following Khandker, Bakht, and Koolwal (2009), a weighted least squares regression is implemented using the difference of the outcome and covariates between the two time periods. The estimates are the same as a difference-in-difference estimator, but with some loss of efficiency. The approach allows us to also consider the initial characteristics of the programme sites and control villages, including shocks faced by households related to the conflict and agricultural shocks prior to the baseline that may influence the programme placement and aid in the different communities at baseline and over time. Woreda fixed effects are also included to control for distance from the capital, differences in agro-climatic factors, and the fact that the programme varied slightly across the three woredas. Specifically, we estimate:

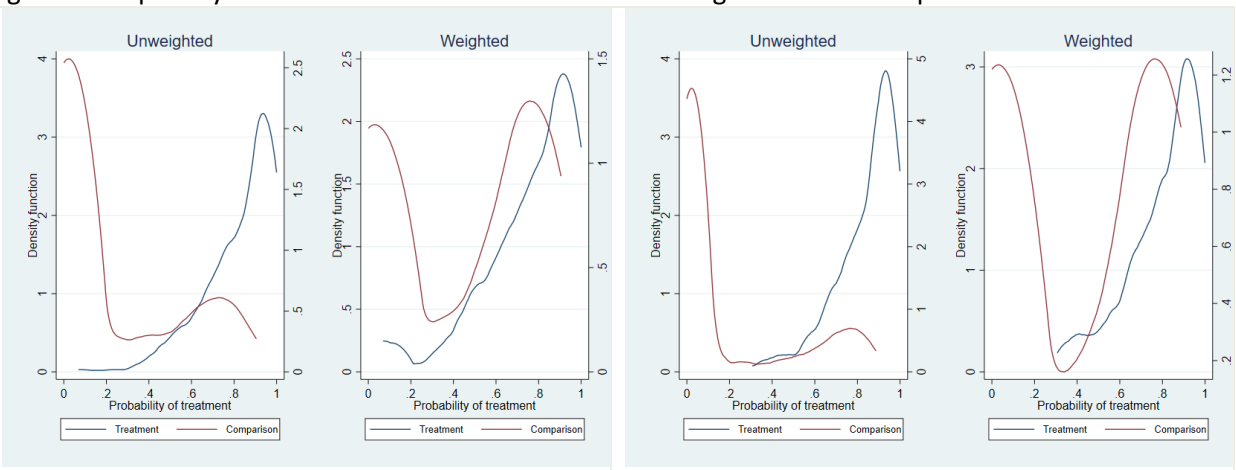
$$y_{mi} - y_{bi} = D_i' \beta_{Impact} + (\boldsymbol{x}_{mi} - \boldsymbol{x}_{bi})' \boldsymbol{\beta_i} + \boldsymbol{x}_{bi}' \boldsymbol{\theta_i} + \boldsymbol{n_i}' \boldsymbol{\gamma_i} + \omega_i + \varepsilon_{mi} - \varepsilon_{bi}, (2)$$

where y is the outcome variable of individual, i, at the midline, m, and baseline, b; D indicates whether the individual, i, is a beneficiary or in the comparison group; $\boldsymbol{x}$ is a vector of individual and household characteristics as defined in equation (1); $\boldsymbol{n}$ is a vector containing the woredas; ω is the weight using the propensity scores estimated in equation (1); and ε is the error term. $\boldsymbol{\beta_i}$ is the vector estimates from the change in household and individual characteristics from baseline to midline, and $\boldsymbol{\theta_i}$ is the vectors estimates from the baseline characteristics, $\boldsymbol{\gamma_i}$ is the vector estimates of woreda fixed effects, and β_{Impact} is the estimated impact of the programme for the treatment group.

In Afar, which only has information for the midline survey, our empirical strategy is to use a single difference estimator with Inverse Probability Weighting (IPW). A single difference estimator is a cross-sectional estimator and cannot account for omitted time invariant differences between the treatment and comparison groups. To address this the best we can, we control for differences between the treatment and control groups that are correlated with empowerment. To address the non-random assignment of the two groups, we also use the same approach with the weights as for the empirical strategy in Oromia. For the

propensity score estimation, we estimate treatment using the following baseline characteristics: age at baseline, household demographics at baseline, marital status at baseline, educational attainment, household assets based on the wealth index, individual asset ownership at baseline, and household distance from services. There are large differences between the comparison and treatment groups in respect of engaging in cropping activities. The women in the treatment group are primarily in pastoralist households, whereas the comparison group includes a mix of pastoralist households and households engaged in cropping activities. Since controlling for cropping activities directly perfectly predicts the comparison group, it cannot be included in the probit estimation. We proxy the likelihood of engaging in cropping activities by controlling for whether the household holds rights to land through the village leader, which is highly correlated with participation in cropping activities. This should help control for differences in the two groups to discern those who are in pastoralist households and those not engaged in cropping activities. We also control for those who participate in wage labour and self-employment activities at baseline. To control for social capital and the characteristics that prompts community group participation, we control for the number of group memberships at baseline. The probit estimation results are presented in Appendix B, with marginal effects calculated at the sample mean. The rights over land, engagement in livestock activities, and social capital variables are significant and have the expected signs. The wealth index, age, marital status before baseline, and household size are also significant. Figure 5 presents the resulting propensity score distributions with and without weights. A weighted least squares regression is implemented using baseline covariates from recall questions on outcome variables at midline. The regressions include the same covariates as in the probit estimates as well as controls for the exogenous idiosyncratic and agricultural shocks. Even with these controls, there is likely still some heterogeneity between treatment and control groups in the error term that is correlated with the treatment, and the estimates need to be interpreted with caution.

Figure 5. Propensity score distributions with and without weights for Afar samples



Women in RUSACCO compared to control | Married women in RUSACCO compared to control

Source: Data from UNJP-RWEE impact evaluation study.

In Oromia, we investigate the impact of the programme on women's overall empowerment, measured by the proportion of adequate indicators and whether the individual achieved empowerment in at least 75 percent of the indicators. In addition, for couple households, we explore the impact on gender parity within the household. These indicators should be interpreted cautiously, as two of the indicators in the index (access to and decisions over credit and group membership) are endogenous in that the indicators were used to determine the sample of the treatment groups.

In both regions, we assess the UNJP-RWEE impact on the number of household credit sources. To assess whether the UNJP-RWEE successfully improved women's economic empowerment following the aims of the programme, we investigate the impact on women's autonomy in income, membership in influential groups (as a way to measure leadership), input in productive decisions in agriculture, and control over the use of income. We also investigate the impact on women's ownership of land and other assets, attitudes about intimate partner violence and respect among household members, visiting important locations, and work balance. In couple households, we investigate the impact on respect among household members for both married men and women.

In Oromia, since women and men achieve full empowerment in productive decisions in agriculture, control over the use of income, and ownership of land and other assets at both baseline and midline when

we disaggregate these indicators. For decisions about agricultural production, we investigate the programme's impact on the number of agricultural production activities the respondent makes decisions about or feels she could make the decision if she wanted to. Similarly, for control over the use of income, which includes control over both income and output, we use three indicators. We explore whether there are programme impacts on the number crop and livestock activities that the respondent makes decisions (or could make the decisions about if she wanted to) regarding the use of the output. We also investigate the impact on the number of total income activities as well as total non-agricultural activities that the respondent makes decision (or could make the decision about if she wanted to) regarding how to use the income earned. For changes in asset ownership, we estimate the impact on the number of large assets owned by the individual, excluding land.

Since the programme, including the establishment of the RUSACCOs came after the baseline data was collected in Afar, we investigate the impact on all the pro-WEAI indicators, including access to and decisions over credit and group membership. Additionally, since fewer respondents in our sample achieve empowerment across the indicators, we do not disaggregate the indicators in detail.

6 Results

Tables 14, 15, and 16 present the impacts on overall empowerment and on the eleven dimensions of empowerment. In Oromia, as expected, those beneficiaries who continued in good standing from baseline to midline saw no impact on the number of household credit sources whereas, on average, there were statistically significant decreases in the number of household credit sources for those beneficiaries who lost access to credit.

The majority of women in the treatment and comparison groups in Oromia were already empowered across a number of the pro-WEAI indicators at baseline. Because of this, we do not see impacts of the UNJP-RWEE in terms of overall empowerment and gender parity within the household between the comparison group and the beneficiaries who continued in good standing. The individual indicators also reveal little evidence of any additional impacts of the programme on the beneficiaries who continued in

good standing. The only exception is that continuing in the programme appears to have resulted in a greater likelihood of both married women and men achieving empowerment with regards to respect among family members. This may be a result of the programme activities aimed at empowering women in combination with the gender-sensitivity training in the communities. With a mindset of advancing gender equality, family members are less likely to be threatened by and to resist women's empowerment and the changing power relations within the household. There is also a greater likelihood that family members cooperate to achieve greater women's empowerment.

In contrast, there are large decreases in empowerment for the beneficiaries who lost access to credit. For both men and women, there are decreases in autonomy of income, attitudes toward intimate partner violence , and work balance. For women, there is also a decrease in membership in influential groups. Overall, women are 10 percent less empowered, on average. Married women and men in this treatment group are, on average, about 12 percent less empowered. In addition, there is an average 39 percent decrease in gender parity within the household.

Table 14. UN Joint Programme impacts on specific groups

	Oromia							Afar	
	Women		Married women		Married men			Women	Married women
	Beneficiaries with access to credit	Lost access to credit or left RUSACCO	Beneficiaries with access to credit	Lost access to credit or left RUSACCO	Beneficiaries with access to credit	Lost access to credit or left RUSACCO			
Autonomy in income	0.0765 (0.2259)	-0.206**+ (0.0065)	0.0907 (0.2682)	-0.254**+ (0.0039)	0.123 (0.1608)	-0.251**+ (0.0053)		-0.215* (0.0158)	-0.108 (0.3234)
Attitudes about intimate partner violence	-0.0537 (0.3968)	-0.177**+ (0.0147)	-0.0500 (0.5125)	-0.342**+ (0.0000)	-0.0483 (0.5055)	-0.310**+ (0.0001)		-0.00830 (0.9319)	-0.148 (0.1514)
Respect among household members / Respect among spouses	-	-	0.209**+ (0.0035)	0.0187 (0.8522)	0.275**+ (0.0007)	0.0200 (0.8376)		-	-0.0945 (0.3464)
Input in productive decisions in agriculture	-	-	-	-	-	-		0.0437 (0.4184)	0.0629 (0.3891)
Number of agricultural production activities individual makes decisions over or could if she/he wanted to	-0.0394 (0.6913)	-0.129 (0.3534)	-0.0718 (0.5285)	-0.0635 (0.6717)	-0.147 (0.2274)	0.000159 (0.9992)		-	-
Ownership of land and other assets	-	-	-	-	-	-		-0.0508 (0.2256)	-0.0188 (0.7132)
Number of large assets owned beyond land	0.164 (0.1345)	-0.0747 (0.6481)	0.163 (0.2368)	-0.0482 (0.8289)	0.0564 (0.6624)	-0.134 (0.5431)		-	-
Access to and decisions on financial services	-	-	-	-	-	-		0.448**+ (0.0000)	0.403**+ (0.0001)

Source: Data from UNJP-RWEE impact evaluation study. Notes: In Oromia, these are the estimated UN joint programme impacts using a difference in difference estimator with inverse probability weight, and take into account heteroscedastic residuals. In Afar, these are the estimated UN joint programme impacts using a first difference estimator with inverse probability weights and take into account heteroscedastic residuals. The p-values are significant * at $p < 0.10$ and ** $p < 0.05$, and significant + after controlling for a false discovery rate using the Benjamini-Hochberg procedure (1995) of 0.05. The standard errors in parentheses. The Oromia models control for age at baseline, marital status at baseline, literacy at baseline, primary education or higher, number of children under the age of 5 years old at baseline, number of households members at baseline, whether the household has agricultural and non-agricultural land at baseline, wealth index, time it takes to get to a primary school at baseline, the respondent's main employment activity at baseline, whether household was impacted by exogenous idiosyncratic shocks or agricultural shocks in 2018, change in number of children under five years, change in marital status, change in household size, and woreda. The spouse model excludes the marital indicators and includes age, education, and land ownership from both spouses. In Afar the model controls for age and marital status in 2016, literacy, primary education or higher, number of children in 2016, household size in 2016, wealth index, whether the household owns non-agricultural land, whether the respondent owned large and small livestock in 2016, employment activities, exogenous idiosyncratic and agricultural shocks in 2018.

Table 15. UN Joint Programme impacts on specific groups (continued)

	Oromia							Afar	
	Women		Married women		Married men			Women	Married women
	Beneficiaries with access to credit	Lost access to credit or left RUSACCO	Beneficiaries with access to credit	Lost access to credit or left RUSACCO	Beneficiaries with access to credit	Lost access to credit or left RUSACCO			
Control over use of income	-	-	-	-	-	-		0.107* (0.0397)	0.134* (0.0603)
Number of agricultural activities the respondent makes decisions over or could if she/he wanted in regards to agricultural output	-0.0760 (0.4445)	-0.158 (0.2584)	-0.105 (0.3554)	-0.0749 (0.6200)	-0.173 (0.1557)	-0.0213 (0.8879)		-	-
Number of non-agricultural activities the respondent makes decisions over or could if she/he wanted in regards to the use of the income from the activity	0.0131 (0.8288)	0.00559 (0.9426)	0.00338 (0.9639)	0.0341 (0.7278)	-0.0214 (0.8092)	-0.0124 (0.8968)		-	-
Number of non-agricultural and agricultural activities the respondent makes decisions over or could if she/he wanted in regards to the use of the income from the activity	-0.0509 (0.6685)	-0.145 (0.3923)	-0.0916 (0.5070)	-0.0430 (0.8161)	-0.177 (0.2520)	-0.0340 (0.8477)		-	-

Source: Data from UNJP-RWEE impact evaluation study. Notes: In Oromia, these are the estimated UN joint programme impacts using a difference in difference estimator with inverse probability weight, and take into account heteroscedastic residuals. In Afar, these are the estimated UN joint programme impacts using a first difference estimator with inverse probability weights and take into account heteroscedastic residuals. The p-values are significant * at $p < 0.10$ and ** $p < 0.05$; and significant + after controlling for a false discovery rate using the Benjamini-Hochberg procedure (1995) of 0.05. The standard errors in parentheses. The Oromia models control for age at baseline, marital status at baseline, literacy at baseline, primary education or higher, number of children under the age of 5 years old at baseline, number of households members at baseline, whether the household has agricultural and non-agricultural land at baseline, wealth index, time it takes to get to a primary school at baseline, the respondent's main employment activity at baseline, whether household was impacted by exogenous idiosyncratic shocks or agricultural shocks in 2018, change in number of children under five years, change in marital status, change in household size, and woreda. The spouse model excludes the marital indicators and includes age, education, and land ownership from both spouses. In Afar the model controls for age and marital status in 2016, literacy, primary education or higher, number of children in 2016, household size in 2016, wealth index, whether the household owns non-agricultural land, whether the respondent owned large and small livestock in 2016, employment activities, exogenous idiosyncratic and agricultural shocks in 2018.

Table 16. UN Joint Programme impacts (continued)

	Oromia							Afar	
	Women		Married women		Married men			Women	Married women
	Beneficiaries with access to credit	Lost access to credit or left RUSACCO	Beneficiaries with access to credit	Lost access to credit or left RUSACCO	Beneficiaries with access to credit	Lost access to credit or left RUSACCO			
Work balance	-0.0330 (0.5486)	-0.155* (0.0406)	-0.0454 (0.5137)	-0.290**+ (0.0004)	-0.0497 (0.5049)	-0.289**+ (0.0003)		0.0328 (0.7257)	-0.0246 (0.7957)
Visiting important locations	0.00857 (0.7663)	0.00243 (0.9632)	-0.0207 (0.5494)	-0.0326 (0.5435)	-0.0370 (0.3226)	-0.00978 (0.8523)		0.243**+ (0.0027)	0.160 (0.1147)
Group membership	-	-	-	-	-	-		0.882**+ (0.0000)	0.877**+ (0.0000)
Membership in influential groups	-0.00654 (0.9091)	-0.121* (0.0969)	0.0336 (0.6415)	-0.0783 (0.3420)	0.0750 (0.3340)	-0.115 (0.1707)		0.315**+ (0.0000)	0.336**+ (0.0000)
3DE	0.00740 (0.6331)	-0.101**+ (0.0000)	0.0330 (0.1131)	-0.117**+ (0.0000)	0.0459** (0.0361)	-0.117**+ (0.0000)		0.180**+ (0.0000)	0.144**+ (0.0000)
Empowered	-0.0550 (0.3494)	-0.366**+ (0.0000)	0.0311 (0.6957)	-0.463**+ (0.0000)	0.0682 (0.4151)	-0.470**+ (0.0000)		0.253**+ (0.0000)	0.176**+ (0.0001)
Gender parity			-0.00278 (0.9712)	-0.389**+ (0.0001)					
Household credit sources	0.0430 (0.8306)	-0.889**+ (0.0003)	0.137 (0.5982)	-1.286**+ (0.0000)	0.0669 (0.8043)	-1.409**+ (0.0000)		1.052**+ (0.0000)	0.969**+ (0.0000)

Source: Data from UNJP-RWEE impact evaluation study. Notes: In Oromia, these are the estimated UN joint programme impacts using a difference in difference estimator with inverse probability weight, and take into account heteroscedastic residuals. In Afar, these are the estimated UN joint programme impacts using a first difference estimator with inverse probability weights and take into account heteroscedastic residuals. The p-values are significant * at $p < 0.10$ and ** $p < 0.05$; and significant + after controlling for a false discovery rate using the Benjamini-Hochberg procedure (1995) of 0.05. The standard errors in parentheses. The Oromia models control for age at baseline, marital status at baseline, literacy at baseline, primary education or higher, number of children under the age of 5 years old at baseline, number of households members at baseline, whether the household has agricultural and non-agricultural land at baseline, wealth index, time it takes to get to a primary school at baseline, the respondent's main employment activity at baseline, whether household was impacted by exogenous idiosyncratic shocks or agricultural shocks in 2018, change in number of children under five years, change in marital status, change in household size, and woreda. The spouse model excludes the marital indicators and includes age, education, and land ownership from both spouses. In Afar the model controls for age and marital status in 2016, literacy, primary education or higher, number of children in 2016, household size in 2016, wealth index, whether the household owns non-agricultural land, whether the respondent owned large and small livestock in 2016, employment activities, exogenous idiosyncratic and agricultural shocks in 2018.

In Afar, the beneficiaries and comparison individuals started from a lower level of empowerment than the women in the Oromia sample, and the programme appears to have resulted in greater empowerment, measured by the overall empowerment scores. Looking at the individual indicators separately, the programme appears to have resulted in a greater likelihood of beneficiary women achieving empowerment with regards to access to and decisions on financial services, group membership, and membership in influential groups, as we would expect given the nature of the programme. There also appears to be positive impacts on the ability visiting important locationsas well as control over the use of income, suggesting that the programme contributed to greater control over the use of the output from agricultural activities and control over income from agricultural and non-agricultural activities. On the other hand, the programme appears to have resulted in reduced empowerment with regards to autonomy in income. Together, this suggests that programme participants, on average, have greater control over the use of income but the programme also impacted participants' internal agency in a way that compels them to use the income based more on the expectations from their spouse, other family members, and the community rather than what they personally think is best for themselves and their families.

7 Conclusion

Using the project-Women's Empowerment in Agricultural Index (pro-WEAI) survey tool developed by GAAP2, this study aims to estimate the impact of a microfinance 'plus' programme on women's economic empowerment in communities in Oromia and Afar, Ethiopia. The programme incorporates multiple interventions, which are implemented through women-run rural savings and credit cooperatives (RUSACCOs), with the intention of improving beneficiary women's decision-making over productive assets, control over income, and leadership in rural institutions. A major component of the programme is aimed at rural women's greater access to credit, but interventions also include agricultural livestock and technology transfers, business training, as well as a community gender awareness component.

Because of conflict in the area, baseline data collection was delayed and data was collected after some interventions had already begun in Oromia. As such, nearly all beneficiaries already had access to

credit through the RUSACCOs at baseline, and both women and men were already empowered in a number of dimensions at baseline. Among households with beneficiaries who continued in good standing between baseline and midline, the programme positively contributed to both women's and men's empowerment with regards to respect among household members. It did not lead to additional impacts in terms of overall empowerment and gender parity within the household or across the other pro-WEAI indicators. However, it appears that, by maintaining good standing in the RUSACCOs, female participants were able to maintain high levels of empowerment across the other indicators.

A second group of beneficiary women, who either chose to leave the RUSACCO or did not maintain good standing as a member, were also highly empowered across many dimensions at baseline but experienced large average decreases in empowerment by midline. Loosing access to credit through the programme negatively contributed to both women's and men's empowerment with regards to attitudes about intimate partner violence , autonomy over income, and work balance.

These two groups (those beneficiaries who continued in good standing and those who lost access to credit) differ at baseline primarily in terms of the woreda in which they live and social capital. More individuals in the group of beneficiaries who lost access to credit live in the Adam Tulu and Dodala woredas than in Yaya Gulele. More loans were disbursed in Yaya Gulele than in the other two woredas, possibly due to a greater demand for loans and more income generating opportunities in Yaya Gulele. Yaya Gulele is closer to Addis Ababa and, may therefore have better access to certain markets. It is also possible that the UNJP-RWEE did not fully meet the needs of the communities in the three woredas. The qualitative report suggested that beneficiaries requested larger loans in Adami Tulu but that the credit provided was less than what they requested in their business plans (Nigussie et al., 2017). According to them, the loan amount was not sufficient for an investment that would enable them to conduct business in a more profitable way and, as a result, they reverted back to traditional practices that had lower earning potential.

Additionally, unlike in Yaya Gulele, fieldworkers did not mediate between the RUSACCO members and the woreda focal persons in Adami Tulu (Nigussie et al., 2017). This may have resulted in favoritism or a lack of fairness, wherein those who know the focal persons were more likely to receive the

programme benefits. Indeed, the quantitative data suggests that those with more established ties to the RUSACCO appeared to be more likely to continue in the groups and have access to credit. In another qualitative study, Mulema et al. (N.D.) explain that the group dynamics and the lack of a mediator meant that interventions in Adami Tulu were implemented in a way that allowed some members to benefit while others were excluded, causing tensions in the group.

In Afar, the programme had a significant impact on women's overall empowerment. As we expected, given the nature of the programme, there were significant positive results in terms of access to and decisions on financial services, group membership, and membership in influential groups. There were also positive impacts on control over the use of income, suggesting that the programme contributed to greater control over the use of the output from agricultural activities and control over income from agricultural and non-agricultural activities. On the other hand, the programme also appears to have resulted in reduced empowerment on average with regards to autonomy in income. This suggests that the programme also impacts participants' internal agency in a way that prompts them to use the income based more on what others think rather than what they personally think is best.

There appears to be greater impacts on empowerment in Afar than in Oromia, even though fewer resources were dedicated to the programme in Afar. This may be because the programme fills greater gaps in women's economic empowerment and opportunities available within the community, such as access to credit and group membership. It may also be data related. In Oromia, the baseline was administered after the start of the programme. Without a true baseline, the impact of the programme in Oromia may not be fully captured in our estimates. Additionally, because women are already fully empowered in these communities across many of these indicators, there no additional benefit is recorded by the pro-WEAI modules as a result of the programme.

Overall, the UNJP-RWEE appears to have successfully empowered beneficiaries in Afar and, those who were able to maintain good standing in the programme in Oromia. Self-help groups can be a powerful collective empowerment tool in that they often aim to provide mutual assistance to economically improve members' lives (Gugerty et al., 2019). There can also be a powerful collective dimension, where women

come together to discuss shared issues, strengthening their ability to face challenges together. Yet, on the other hand, group dynamics can be disempowering when they do not take into account the needs of all the members or when benefits are not distributed fairly, as appears may have been the case in Oromia (e.g. Gugerty & Kremer, 2008). There can also be barriers to participation. When the activities are time-consuming, members may not have the time to participate because of their other responsibilities. Groups can also be disempowering if they enforce norms by instituting powerful social sanctions when members do not act "appropriately." It may be that new norms for group members were created in Afar for how women "should" use the money now that they have greater decision-making power, and that members felt pressure to conform to the group rather than act on what would be best for themselves.

On the other hand, it may be that more time needs to pass for the internal empowerment process to take place. The gender awareness dialogues can be powerful tools towards greater self-awareness and empowerment. In the UNJP-RWEE, these dialogues focus more on women's rights, gender roles and norms, and gender equality, and less on the process of internal empowerment and self-respect. It is assumed that, with increased gender consciousness, the intrinsic empowerment process will follow.

Given that changes to gender norms often take time and that detecting impacts on women's empowerment in a relatively short period is challenging, the overall results are positive. This study shows that the benefits of the UNJP-RWEE are detectable despite the relatively short period of programme implementation covered by this evaluation (slightly more than two years), pointing to the potential strength of adopting integrated (multi-pronged) micro-credit programmes to accelerate progress towards women's empowerment.

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Appendix A. Wealth index

The survey includes detailed information on the construction and condition of the household dwelling and the households' access to social provisions and services. Using this information, we construct a wealth index based on the principal components analysis approach discussed in Filmer and Pritchett (2001). Wealth portrays a more permanent status of economic wellbeing than other indicators such as household income. Additionally, a wealth index allows us to incorporate indicators that are important to wellbeing that are publically provided, such as electricity and piped water.

For principal components analysis, the first principal score (the index value) for household j, where $j = 1, 2, 3 \ldots n$, given an asset vector $\boldsymbol{X_i}$ of k assets is $y_j = \begin{pmatrix} b_1 \\ \ldots \\ b_k \end{pmatrix} \left(\frac{x_1 - \bar{x}_1}{s_1} \quad \ldots \quad \frac{x_k - \bar{x}_k}{s_k} \right)$ where $\bar{x}_i \; and \; s_i$ are the mean and standard deviation of the variable x_i and $\boldsymbol{B'} = \begin{pmatrix} b_1 \\ \ldots \\ b_k \end{pmatrix}$ are values such that the linear combination, $y = b_1 \frac{x_1 - \bar{x}_1}{s_1} + b_2 \frac{x_2 - \bar{x}_2}{s_2} + \cdots + b_k \frac{x_k - \bar{x}_k}{s_k}$, maximizes the variance for the sample of j households of all the possible linear combination and $\boldsymbol{B'B} = \boldsymbol{1}$ (Filmer and Pritchett 2001; Mckenzie 2004).

$\boldsymbol{B'} = \begin{pmatrix} b_1 \\ \ldots \\ b_k \end{pmatrix}$ are weights. For assets that few households own or that nearly all households own, the weight is near zero; whereas assets with greater variance are given a larger weight. The product of the principle component and standard deviation represents the change in the household index score if the household holds the asset.

We construct a wealth index using 28 dummy variables in Oromia and 25 dummy variables in Afar for whether or not a household has an asset. We use a variety of assets to try to capture wealth across the distribution, including dwelling materials, type of toilet facility, electricity, main water source in the dry season, and cell phones. The scoring factors and summary statistics are in Tables 17 and 18. Based on the type of assets the household holds and the asset weight, a household is assigned a wealth index score relative

to other households. The individual scores in the index are arbitrary but, as a whole, the index can be used to explore wealth across the distribution.

Table 17. Oromia scoring factors and summary statistics for the wealth index

Household Assets	Principal Component	Mean	Standard Deviation	Principal Component * Standard deviation
Dwelling is made of corrugated iron	0.359	0.664	0.473	0.170
Traditional house	-0.215	0.180	0.384	-0.083
Traditional hut	-0.239	0.156	0.363	-0.087
Floor of the dwelling is earth, dirt, or sand	-0.166	0.980	0.140	-0.023
Electricity	0.289	0.233	0.423	0.122
Kerosene lamp	0.035	0.113	0.317	0.011
Battery lamp	-0.186	0.272	0.445	-0.083
Household does not have a toilet facility	-0.091	0.272	0.445	-0.040
Household has an open pit latrine	-0.001	0.499	0.500	-0.001
Household uses improved latrine	0.090	0.228	0.420	0.038
Household uses flush toilet	0.086	0.001	0.037	0.003
Water tap on compound	0.231	0.108	0.311	0.072
Use neighbor's tap	0.069	0.563	0.496	0.034
Well or borehole	-0.107	0.073	0.261	-0.028
Unimproved water source	-0.176	0.229	0.421	-0.074
Exterior walls made of wood and mud	-0.157	0.989	0.103	-0.016
Exterior walls made of cement, concrete, and/or stones and cement	0.157	0.011	0.103	0.016
Roof is made of corrugated iron	0.365	0.607	0.489	0.178
Roof is made of straw or thatch	-0.347	0.303	0.460	-0.159
Roof is made of plastic	-0.004	0.003	0.052	0.000
Household owns non-mechanized farm equipment	0.016	0.967	0.180	0.003
Household owns mechanized farm equipment	0.073	0.012	0.109	0.008
Household owns non-farm business equipment	0.020	0.047	0.211	0.004
Household owns large consumer durables	0.252	0.099	0.298	0.075
Household owns small consumer durables	0.180	0.687	0.464	0.084
Household owns cell phone	0.146	0.769	0.422	0.062
Household owns a means of transport	0.241	0.197	0.398	0.096
Household own house or building	0.112	0.879	0.327	0.037

Source: Data from UNJP-RWEE impact evaluation study. Notes: Each variable takes the value 1 if true, 0 otherwise. The principal component is the "weight" assigned to each variable (normalized by its mean and standard deviation). * The principle component multiplied by the standard deviation represents the change in the household index score if the household holds the asset.

Table 18. Afar scoring factors and summary statistics for the wealth index

Household Assets	Principal Component	Mean	Standard Deviation	Principal Component * Standard deviation
Dwelling is made of corrugated iron	0.331	0.082	0.275	0.091
Traditional house	0.070	0.151	0.358	0.025
Traditional hut	-0.274	0.767	0.423	-0.116
Floor of the dwelling is earth, dirt, or sand	-0.212	0.970	0.170	-0.036
Electricity	0.342	0.103	0.304	0.104
Kerosene lamp	-0.016	0.021	0.142	-0.002
Battery lamp	-0.266	0.811	0.392	-0.104
Household does not have a toilet facility	-0.243	0.580	0.494	-0.120
Household has an open pit latrine	0.184	0.370	0.483	0.089
Household uses improved latrine	0.143	0.050	0.219	0.031
Water tap on compound	0.259	0.269	0.444	0.115
Use neighbor's tap	-0.051	0.253	0.435	-0.022
Well or borehole	-0.049	0.110	0.313	-0.015
Unimproved water source	-0.161	0.368	0.483	-0.078
Exterior walls made of wood and mud	0.149	0.276	0.448	0.067
Exterior walls made of cement, concrete, and/or stones and cement	0.175	0.018	0.134	0.023
Exterior walls made of stones with wood and straw	0.097	0.018	0.134	0.013
Exterior walls made of wood and straw	-0.226	0.676	0.469	-0.106
Exterior walls made of sheet metal	0.028	0.011	0.106	0.003
Roof is made of corrugated iron	0.354	0.105	0.307	0.109
Roof is made of straw or thatch	-0.195	0.667	0.472	-0.092
Roof is made of plastic	-0.041	0.208	0.406	-0.017
Household owns non-farm business equipment	0.018	0.016	0.126	0.002
Household owns large consumer durables	0.292	0.062	0.241	0.070
Household owns cell phone	0.047	0.626	0.485	0.023

Source: Data from UNJP-RWEE impact evaluation study. Notes: Each variable takes the value 1 if true, 0 otherwise. The principal component is the "weight" assigned to each variable (normalized by its mean and standard deviation). * The principle component multiplied by the standard deviation represents the change in the household index score if the household holds the asset.

Appendix B. Probit estimations of propensity scores

Table 19. Probit estimation on participation at baseline in Oromia – all female sample

	Beneficiaries with access to credit through RUSACCO		Lost access to credit or left RUSACCO	
	dF/dx	Average marginal (partial) effects	dF/dx	Average marginal (partial) effects
Age at baseline	-0.00257 (0.00682)	-0.000803 (0.00213)	0.00727 (0.00765)	0.00210 (0.00220)
Married before baseline	-0.320 (0.168)	-0.100 (0.0521)	-0.0559 (0.212)	-0.0162 (0.0612)
Illiterate	-0.991* (0.399)	-0.310* (0.124)	0.261 (0.397)	0.0756 (0.115)
Primary education or higher	-1.134** (0.389)	-0.355** (0.120)	0.0562 (0.384)	0.0163 (0.111)
Number of children at baseline	-0.0540 (0.0778)	-0.0169 (0.0243)	-0.0211 (0.0868)	-0.00610 (0.0251)
Household size at baseline	0.0311 (0.0312)	0.00973 (0.00973)	-0.0462 (0.0358)	-0.0134 (0.0103)
Oromia wealth index	-0.00580* (0.00272)	-0.00181* (0.000839)	-0.00330 (0.00327)	-0.000953 (0.000938)
Minutes to travel to nearest school	0.00237 (0.00375)	0.000741 (0.00117)	0.00629 (0.00433)	0.00182 (0.00125)
Household holds land	-0.273 (0.159)	-0.0854 (0.0494)	-0.0615 (0.196)	-0.0178 (0.0567)
Agriculture is the main employment	0.125 (0.123)	0.0390 (0.0384)	0.199 (0.146)	0.0575 (0.0420)
Number of group memberships before 2016	0.0875 (0.0722)	0.0274 (0.0225)	0.0361 (0.0949)	0.0104 (0.0274)
Joined RUSACCO in 2015 or earlier	1.182*** (0.130)	0.369*** (0.0318)	0.754*** (0.159)	0.218*** (0.0441)
Number of female and mixed groups in the community at baseline	0.0489 (0.0532)	0.0153 (0.0166)	0.00239 (0.0613)	0.000691 (0.0177)
Household face idiosyncratic shock	-0.266 (0.222)	-0.0831 (0.0693)	-0.138 (0.280)	-0.0400 (0.0810)
Household face agricultural shock	-0.157 (0.141)	-0.0490 (0.0440)	-0.245 (0.162)	-0.0708 (0.0466)
woredas (omitted: Adami Tulu) Yaya Gulele	-0.194 (0.204)	-0.0607 (0.0636)	-0.919*** (0.265)	-0.266*** (0.0732)
Dodala	0.0281 (0.198)	0.00878 (0.0620)	-0.229 (0.226)	-0.0663 (0.0648)
Constant	0.761 (0.611)		-0.712 (0.638)	
Observations	599	599	474	474
Chi-squared	144.7		84.5	
Prob>chi-squared	0.000		0.000	

Source: Data from UNJP-RWEE impact evaluation study. Notes: * Significance as the 5 percent level. ** =1%. The standard errors in parentheses

Table 20. Probit estimation on participation at baseline in Oromia for couple households (female)

	Beneficiaries with access to credit through RUSACCO		Lost access to credit or left RUSACCO	
	dF/dx	Average marginal (partial) effects	dF/dx	Average marginal (partial) effects
Age at baseline of wife	0.0154 (0.0174)	0.00449 (0.00503)	0.0447* (0.0195)	0.0114* (0.00482)
Age at baseline of husband	-0.00883 (0.0126)	-0.00257 (0.00365)	-0.0469** (0.0154)	-0.0120** (0.00376)
Illiterate	-1.087* (0.465)	-0.316* (0.134)	0.341 (0.420)	0.0872 (0.108)
Primary education or higher of wife	-1.149* (0.454)	-0.334* (0.130)	-0.0300 (0.402)	-0.00768 (0.103)
Primary education or higher of husband	-0.223 (0.158)	-0.0648 (0.0459)	-0.142 (0.206)	-0.0363 (0.0527)
Number of children age 0 to 5 years at baseline	0.0276 (0.0995)	0.00802 (0.0289)	-0.105 (0.113)	-0.0268 (0.0288)
Household size at baseline	0.0240 (0.0394)	0.00699 (0.0114)	-0.0673 (0.0507)	-0.0172 (0.0129)
Oromia wealth index	-0.00398 (0.00340)	-0.00116 (0.000984)	0.00255 (0.00388)	0.000653 (0.000996)
Minutes to travel to nearest school	-0.00122 (0.00436)	-0.000354 (0.00127)	0.00963 (0.00493)	0.00246* (0.00125)
Wife holds land	0.211 (0.429)	0.0613 (0.125)	-0.661 (0.615)	-0.169 (0.157)
Husband holds land	-0.470 (0.409)	-0.137 (0.118)	0.835 (0.615)	0.214 (0.157)
Agriculture is the main employment	0.125 (0.141)	0.0365 (0.0410)	0.366* (0.177)	0.0935* (0.0448)
Number of group memberships	0.108 (0.0882)	0.0313 (0.0256)	0.128 (0.122)	0.0327 (0.0308)
In a RUSACCO before baseline	1.186*** (0.158)	0.345*** (0.0367)	0.799*** (0.194)	0.204*** (0.0481)
Number of female and mixed groups in the community	0.102 (0.0625)	0.0296 (0.0180)	0.00757 (0.0704)	0.00194 (0.0180)
Household face idiosyncratic shock	0.241 (0.250)	0.0702 (0.0723)	0.182 (0.390)	0.0467 (0.0995)
Household face agricultural shock	-0.178 (0.164)	-0.0518 (0.0478)	-0.166 (0.185)	-0.0426 (0.0473)
woredas (omitted: Adami Tulu) Yaya Gulele	-0.0438 (0.245)	-0.0127 (0.0713)	-0.945** (0.316)	-0.242** (0.0780)
Dodala	0.131 (0.254)	0.0381 (0.0738)	0.250 (0.282)	0.0640 (0.0726)
Constant	-0.107 (0.723)		-0.991 (0.673)	
Observations	444	444	365	365
Chi-squared	113.98		64.79	
Prob>chi-squared	0.000		0.000	

Source: Data from UNJP-RWEE impact evaluation study. Notes: * Significance as the 5 percent level. ** =1%. The standard errors in parentheses

Table 21. Probit estimation on participation at baseline in Oromia for couple households (male)

	Beneficiaries with access to credit through RUSACCO		Lost access to credit or left RUSACCO	
	dF/dx	Average marginal (partial) effects	dF/dx	Average marginal (partial) effects
Age at baseline of wife	0.0153 (0.0180)	0.00442 (0.00515)	0.0468* (0.0198)	0.0118* (0.00483)
Age at baseline of husband	-0.00882 (0.0131)	-0.00254 (0.00374)	-0.0480** (0.0157)	-0.0122** (0.00378)
Illiterate	-1.035 (0.606)	-0.298 (0.174)	0.538 (0.432)	0.136 (0.109)
Primary education or higher of wife	-0.195 (0.171)	-0.0563 (0.0489)	-0.340 (0.201)	-0.0861 (0.0509)
Primary education or higher of husband	-1.192 (0.608)	-0.343* (0.174)	0.363 (0.447)	0.0920 (0.113)
Number of children age 0 to 5 years at baseline	0.0542 (0.101)	0.0156 (0.0290)	-0.0799 (0.113)	-0.0202 (0.0286)
Household size at baseline	0.00590 (0.0392)	0.00170 (0.0113)	-0.0651 (0.0508)	-0.0165 (0.0128)
Oromia wealth index	-0.00378 (0.00342)	-0.00109 (0.000979)	0.00338 (0.00392)	0.000856 (0.000997)
Minutes to travel to nearest school	-0.00156 (0.00440)	-0.000448 (0.00127)	0.00799 (0.00496)	0.00202 (0.00125)
Wife holds land	0.246 (0.418)	0.0710 (0.120)	-0.572 (0.630)	-0.145 (0.159)
Husband holds land	-0.484 (0.405)	-0.139 (0.116)	0.691 (0.626)	0.175 (0.158)
Agriculture is the main employment	0.136 (0.141)	0.0391 (0.0406)	0.392* (0.180)	0.0993* (0.0454)
Number of group memberships	0.136 (0.0825)	0.0393 (0.0236)	0.0835 (0.114)	0.0211 (0.0286)
In a RUSACCO before baseline	1.153*** (0.156)	0.332*** (0.0364)	0.829*** (0.189)	0.210*** (0.0462)
Number of female and mixed groups in the community	0.173*** (0.0523)	0.0499*** (0.0146)	0.129* (0.0636)	0.0326* (0.0160)
Household face idiosyncratic shock	0.448 (0.251)	0.129 (0.0717)	0.0887 (0.415)	0.0225 (0.105)
Household face agricultural shock	-0.147 (0.164)	-0.0425 (0.0473)	-0.153 (0.184)	-0.0388 (0.0464)
woredas (omitted: Adami Tulu) Yaya Gulele	0.0197 (0.245)	0.00567 (0.0707)	-0.855** (0.324)	-0.217** (0.0793)
Dodala	0.193 (0.253)	0.0556 (0.0729)	0.286 (0.284)	0.0724 (0.0725)
Constant	-0.363 (0.834)		-1.540* (0.702)	
Observations	444	444	365	365
Chi-squared	118.40		72.41	
Prob>chi-squared	0.00		0.000	

Source: Data from UNJP-RWEE impact evaluation study. Notes: * Significance as the 5 percent level. ** =1%. The standard errors in parentheses

Table 22. Probit estimation on participation at baseline in Afar

	Full sample		Married women	
	dF/dx	Average marginal (partial) effects	dF/dx	Average marginal (partial) effects
Age at baseline	-0.0200*	-0.00339*	-0.0107	-0.00172
	(0.00806)	(0.00136)	(0.0115)	(0.00186)
Married before 2016	0.569**	0.0964**	1.025*	0.166*
	(0.204)	(0.0334)	(0.445)	(0.0704)
Illiterate	0.640	0.108	0.754	0.122
	(0.433)	(0.0734)	(0.475)	(0.0771)
Primary education or higher	-0.155	-0.0262	-0.199	-0.0321
	(0.464)	(0.0785)	(0.509)	(0.0822)
Number of children at baseline	-0.134	-0.0227	-0.158	-0.0256
	(0.0953)	(0.0162)	(0.106)	(0.0172)
Household size at baseline	0.133*	0.0225*	0.115	0.0186
	(0.0521)	(0.00885)	(0.0586)	(0.00955)
Afar wealth index	0.0184***	0.00312***	0.0154***	0.00249***
	(0.00368)	(0.000577)	(0.00408)	(0.000654)
Minutes to primary school	-0.000260	-0.0000440	-0.00113	-0.000182
	(0.00261)	(0.000443)	(0.00308)	(0.000500)
Rights over land	-2.810***	-0.476***	-2.803***	-0.454***
	(0.291)	(0.0326)	(0.289)	(0.0285)
Number of assets owned	-0.179*	-0.0303*	-0.153	-0.0248
	(0.0849)	(0.0142)	(0.1000)	(0.0161)
Engages in livestock activities	0.531**	0.0899**	0.421	0.0682
	(0.198)	(0.0330)	(0.215)	(0.0351)
Engages in non-farm self-employment activities	-0.299	-0.0506	-0.273	-0.0442
	(0.365)	(0.0609)	(0.441)	(0.0704)
Engages in wage and salary work	-0.108	-0.0183	-0.0804	-0.0130
	(0.203)	(0.0345)	(0.228)	(0.0371)
Number of group memberships in 2016	1.574***	0.267***	1.117***	0.181***
	(0.321)	(0.0556)	(0.253)	(0.0431)
Constant	-0.745		-1.314	
	(0.647)		(0.809)	
Observations	435	435	351	351
Chi-squared	156.10		151.98	
Prob>chi-squared	0.000		0.000	

Source: Data from UNJP-RWEE impact evaluation study. Notes: * Significance as the 5 percent level. ** =1%. The standard errors in parentheses

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