



## **Ethiopia Women in Agribusiness Leaders Network**

# Impact Evaluation Midline Report<sup>1</sup>

October 2016

### **PLEASE NOTE**

Results presented in this midline report are very preliminary. The results are presented here primarily to stimulate discussion about the possible channels of impact that might more fully be explored and understood after all the endline data collection have been completed in 2017. Readers are strongly cautioned not to read too much into these preliminary results.

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# 1 Introduction

The World Bank's Africa Region Gender Innovation Lab (GIL) is conducting an impact evaluation of the Women in Agribusiness Leaders Network (WALN) through a randomized control trial (RCT). WALN is a business training, mentoring and networking program targeted at high-potential women entrepreneurs in five regions of Ethiopia. The program was implemented by ACIDI/VOCA between October 2013 and March 2016 as part of the Agricultural Marketing Development (AMDe) component of the Agricultural Growth Program (AGP) funded by USAID and the World Bank Group.

The overall project aimed to increase business performance and community leadership of participating businesswomen by improving their business skills, self-confidence and business networks. WALN included an innovative mentoring component that leveraged the mentor's existing social networks to identify mentees who were given customized business advice. This is a promising low-cost approach to business training that organically extended relevant information and advice to new and fledgling businesses.

The project's development hypothesis was that training, mentoring and networking could expand women's capacity to play leadership roles in sectoral organizations and manage businesses profitably. This was expected to improve women's participation in leadership and decision-making in the overall agriculture sector, catalyzing economic growth.

GIL's impact evaluation of WALN is designed to capture the business, psychosocial and social network effects of business training and mentoring on mentors and mentees. The impact evaluation will focus on four sets of outcomes: (1) business knowledge and skills, (2) self-confidence and trust, (3) business performance, and (4) network participation. Baseline data for this impact evaluation were collected in March-August 2014, and the first follow-up or midline data were collected in August-December 2015. An impact evaluation concept note was produced before the business training activity began and a report analyzing baseline data was produced and submitted to USAID after those data were collected.

This midline report provides a brief overview of the program and impact evaluation in Section 2 followed by a discussion of the midline survey methodology in Section 3. Some mean comparisons and descriptive statistics relating to program participation, knowledge, skills and trust are presented in Section 4. That section also includes a preliminary analysis of the household headship question. Section 5 discusses the baseline balance of the midline sample, while Section 6 provides a more formal analysis of the business performance and knowledge outcomes from the midline data.<sup>2</sup> Section 7 concludes this report and briefly discusses future analytical outputs from the midline data.

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<sup>2</sup> The analysis presented in Sections 4 and 5 focusses on the mentors and on the mentees of treated mentors. Additional analysis utilizing the data related to the mentees of control mentors will be conducted in the midline working paper being prepared by the GIL team.

## 2 Program and Impact Evaluation Description

### 2.1 WALN Program Theory

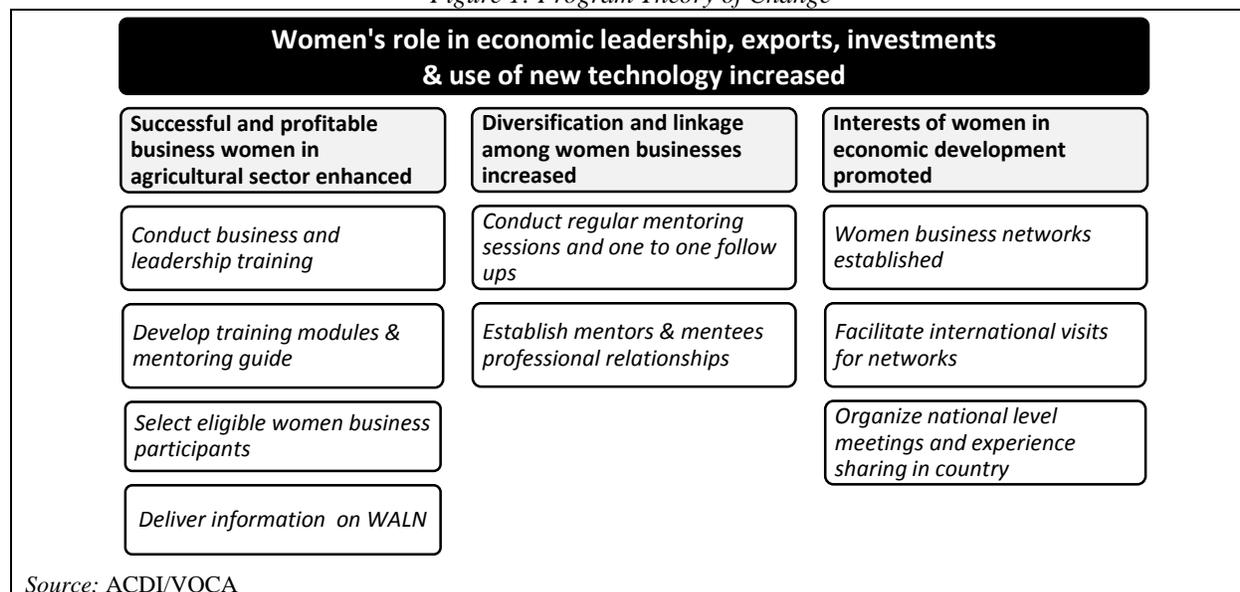
WALN's design expected Ethiopian women agribusiness leaders to improve their own businesses and as a result become more actively engaged in sector-level decision-making in response to three complementary program activities: (1) business and leadership training for a small cohort of high-performing business women who would go on to become mentors, (2) organizes mentoring sessions provided by mentors to promising businesswomen they had nominated as mentees, and (3) seeded a national networking forum of women agribusiness leaders.

WALN's program design was founded on the following assumptions:

- Female agribusiness leaders are interested in engaging more fully in the sector, recognize the value of participating in the training and mentoring programs, and are able to participate;
- Women will become more effective and credible business leaders as their firms become more profitable, as more women-owned firms become successful, and as larger, diversified and more numerous networks are established;
- Networking and training programs have the potential to provide the skills, confidence, and networks necessary to deliver the aforementioned benefits.

Figure 1 below summarizes the program theory of change.

Figure 1: Program Theory of Change



### 2.2 Impact Evaluation

This impact evaluation utilizes a randomized controlled trial (RCT) design to assess the impact of WALN. Half the mentors and mentees eligible to participate in WALN were randomly assigned to

receive the business training and mentoring interventions. The other halves, called the control groups, did not receive the interventions. Comparing the treated groups to the control groups allows us to calculate the impact of the program on the outcomes measured through data collection.

ACDI/VOCA, the program implementer, created a pool of eligible applicants based on a pre-determined set of selection criteria that were applied to information that applicants provided in their application forms. Potential mentees were also nominated at the same time that applicants (later to become mentors) were applying to the program.

The pool of eligible applicants became the sample for the baseline survey. Treatment was randomly assigned to eligible applicants who also responded to the baseline survey. The program operated in AGP target woredas of five regions Tigray, Amhara, Oromia, Addis Ababa and SNNPR. The impact evaluation covers the business training and mentoring activities across all regions. Mentor randomization was stratified by region and firm-size tercile<sup>3</sup>. Mentees of treated mentors were randomly assigned to receive mentoring, stratified by each mentor's pool of eligible mentees. Mentees nominated by control mentors are also included in the impact evaluation but were not assigned a mentoring treatment status.<sup>4</sup>

Figure 2: WALN Experiment Arms, Survey Sample Size, and Survey Attrition

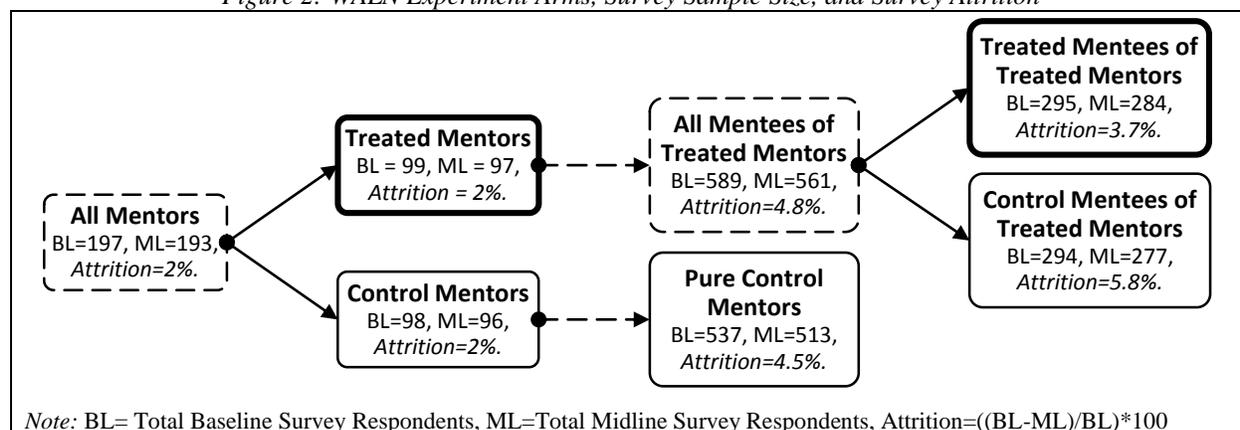


Figure 2 shows the WALN impact evaluation design, the number of women surveyed in each round of data collection, and the attrition in the sample from the baseline to the midline. The dashed boxes show the total mentors and mentees of treated mentors groups; the heavy-bordered boxes show the treatment groups, and the remaining boxes show the control groups.

## 2.3 Data

The WALN baseline survey was conducted from March to August 2014 before the business training was implemented from August to December 2014. Mentoring sessions were conducted between January and July 2015. Midline data collection started in August 2015, 6 months after the business training was

<sup>3</sup> Mentors' registered WALN businesses were ranked from lowest to highest by their number of employees. The distribution was partitioned into three equal parts each containing one-third of mentors. Each third is called a tercile.

<sup>4</sup> All impact evaluation related data collection covers treated and control mentors and the eligible mentees nominated by them at the start of the program. This includes the treated and control mentees of treated mentors and all mentees of the control mentors.

concluded and 1 month after the mentoring sessions ended. Midline data collection and data cleaning activities were concluded by December 2015. Endline data collection is planned for early 2017.

Table 1: Distribution of Respondents

Treatment Status	All Respondents		Married Respondents		Spouses Interviewed	
	Baseline	Midline	Baseline	Midline	Baseline	Midline
Treated <b>Mentors</b>	99	97	60	57	37	37
Control <b>Mentors</b>	97	96	53	55	45	40
Treated <b>Mentees</b> of Treated Mentors	295	284	156	156	97	120
Control <b>Mentees</b> of Treated Mentors	294	277	145	144	102	114
Pure Control <b>Mentees</b>	537	513	302	302	197	231
<i>Totals</i>	1,322	1,267	716	714	478	542

Note: Survey respondents are WALN women.

This report uses baseline and midline survey data for 1,267 women. A smaller dataset of interviews conducted with 547 spouses of married women was also collected and will be utilized for future analysis. Table 1 presents the total number of survey respondents, married respondents, and spouses interviewed in each survey round by treatment status.

## 3 Midline Survey Methodology

### 3.1 Midline Questionnaire Development

The main WALN questionnaire was administered to the women mentors and mentees in the various treatment and control groups of the impact evaluation. The midline questionnaire has 7 modules covering: personal and household information, the WALN business<sup>5</sup>, finance, knowledge and self-confidence, network participation, WALN program participation, and intra-household decision making.

A shorter 3 module questionnaire was also administered to the spouses of WALN women who reported being married. This questionnaire was a subset of the modules in the main questionnaire covering: the WALN business, network participation, and intra-household decision making. Both questionnaires were based on the WALN baseline questionnaire and were extensively updated to take into account the results of the baseline.

A new module was added to the midline to capture WALN program participation with questions on recruitment, training and mentoring participation, and satisfaction. Questions about physical capital and group participation were also added only to the midline spouse questionnaire.

#### Translation

Questionnaires were developed in English and translated into Amharic. The Amharic version was reviewed by GIL team members fluent in the language. Feedback was collected from interviewers and supervisors about the validity of the translated version, especially with regard to technical terms. Comments were collated on the Amharic version and translated back to English by a *different* translator.

<sup>5</sup> The WALN business is the business fitting the made targeting criteria that mentors and mentees registered at the time of application.

The back-translated English version was compared with the original English version and corrections were made to the finalized Amharic version. The paper questionnaire and the electronic questionnaire were bilingual, displaying the questions and responses in both English and Amharic. Based on the baseline experience, GIL had determined that translating the full questionnaire into multiple languages would be unwieldy and so interviewers working in Oromia and Tigray regions were also provided with a glossary of difficult to translate technical words in Oromiffaa and Tigrigna, respectively.

### Programming Electronic Surveys

SurveyCTO was used as the software platform to collect data using 7-inch tablet computers running Android v4.4.2. The questionnaire was programmed by the survey firm and rigorously pilot tested before data collection commenced. Different respondent profiles for interviewers and supervisors along with automatic consistency checks, and prompts to check unusual inputs were integrated into the electronic questionnaire, allowing for real-time data checks and improving the quality of collected data. The questionnaire was also programmed to smartly implement skip patterns based on the respondents' demographic characteristics and previous responses further improving data quality control.

## 3.2 Survey Planning and Execution

This subsection discusses GIL's planning and preparation for survey data collection including survey firm selection, survey management, training and supervision.

### Survey Firm Selection

GIL utilized the following criteria to select a suitable survey firm to conduct the WALN midline survey. The key requirements regarding the qualifications of the survey administration team, field team, electronic data collection, gender, language skills and computer equipment are summarized in Table 2.

*Table 2: Summary of Survey Firm Selection Criteria*

<b>Selection Criteria</b>	
<b>1. Experienced survey administration team</b>	The survey administration team should have a strong demonstrated capacity to: <ul style="list-style-type: none"> <li>• Carefully plan data collection process including timelines, resource requirements, and contingencies</li> <li>• Effectively execute data collection preparation activities such as questionnaire translation, electronic questionnaire programming, survey training, and questionnaire piloting</li> <li>• Supervise data collection including survey team transport logistics and non-response management</li> <li>• Organize their manpower to verify data after the survey</li> </ul>
<b>2. Qualified field data collection team</b>	<ul style="list-style-type: none"> <li>• Minimum data collection experience: 3 years for interviewers and 7 years for supervisors</li> <li>• Previous experience executing electronic data collection</li> <li>• Minimum of 1 female interviewer in each regional survey team</li> <li>• Interviewers and supervisors who speak the local language in Tigray and Oromia</li> </ul>
<b>3. Competent electronic questionnaire programmer</b>	The firm should have on staff at least one programmer who is: <ul style="list-style-type: none"> <li>• Extensively experienced in programming with ODK or SurveyCTO</li> <li>• Proficient in developing an electronic questionnaire to collect high-quality data using real-time data checks through skip codes and contextual questionnaire subsets</li> <li>• Communicative and responsive impact evaluation team</li> </ul>

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<b>Selection Criteria</b>
<p><b>4. Skilled data checker</b> The firm should have on staff at least one data checker who is:</p> <ul style="list-style-type: none"> <li>• Proficient in Stata</li> <li>• Highly detail oriented</li> <li>• Good at coordinating with survey teams to validate data</li> </ul>
<p><b>5. Sufficient hardware software and network platform</b></p> <ul style="list-style-type: none"> <li>• Android tablets that have a camera can record audio, and capture GPS data</li> <li>• ODK or SurveyCTO software for the data collection platform</li> <li>• Remote access internet connectors to allow data upload from the field</li> </ul>

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In line with WBG procurement guidelines, GIL compared the qualifications of several international and local firms using these criteria. BST Survey Solutions PLC, a local Addis Ababa-based firm stood out for their highly skilled and experienced team that had previously delivered high-quality data collection for a reasonable cost. They came highly recommended by WBG colleagues and other agencies working in Ethiopia.

The survey firm agreed to a detailed Terms of Reference (TOR) which included strict quality control protocols. The firm developed the electronic questionnaire, recruited and trained survey teams, supervised data collection and managed data cleaning. Their final deliverable was a clean dataset with all meta-data and data cleaning records which was successfully delivered in January 2016.

### **Survey Management Tools**

GIL worked closely with the survey firm to develop three sets of tools to successfully manage the midline survey data collection activities. First, two survey planning documents were developed. The first planning document was a communication strategy outlining how GIL and the survey firm would communicate and make decisions at each stage of the data collection process. This document listed the responsibilities of the survey firm and the GIL team and described the purpose of each survey management tool. The second planning document was a field procedure plan developed by the survey firm, in which activity sequencing and relationships between survey activities were clearly laid out.

Second, a daily field reporting template was used by field supervisors to track completion status, interview dates, respondent tracking, address changes, and spouse interview status. The survey firm and GIL were able to closely monitor progress across all five teams using this tool, especially respondent refusals, and relocations. Where feasible, relocation cases were transferred to survey teams working in the area that the respondent had relocated to.

Finally, a set of three tools were used to conduct in-field and back-office data quality checks:

- (1) A *back-check questionnaire* was developed using SurveyCTO. 10% of the respondents were randomly selected for a re-visit from a supervisor. The selected respondents were then asked a set of fifteen randomly selected questions.
- (2) The GIL team developed a *data-quality diagnostics Stata do-file* that automatically generated an Excel report with information on key data quality issues. The survey firm's data checker ran these diagnostics on freshly collected data twice weekly and shared the report along with rectifying actions taken with the GIL team.

- (3) The GIL team also developed a *master data checking register* that the survey firm's data checker used to carefully record and justify every change made to the data during the data cleaning process. This register was also used to take notes about changes made to the data as a result of analyzing audio recordings of the interviews, and to keep a log of phone calls made to respondents to verify data.

### **Training and Piloting**

The interviewers and supervisors were trained for two weeks using both paper and electronic versions of the questionnaire by the survey firm leadership and the GIL team. The discussions during the training were used to update the field manuals. Interviewer's interactions with the electronic questionnaire during the training also helped identify and resolve some outstanding programming issues.

A two-day full-scale field pilot was conducted in Dukem, in suburban Addis Ababa. Each interviewer conducted at least one main and one spouse interview. A debriefing session to discuss the survey team's experiences and discuss lessons for the field work was organized, and documented in the survey firm's piloting report.

### **Composition and Distribution of Survey Teams**

The survey firm deployed a total of 25 interviewers and 5 supervisors equally distributed across 5 survey teams. There were 10 women interviewers and one woman supervisor. One team was assigned to cover each of the following areas: (1) Addis Ababa & southwestern Amhara, (2) northern Amhara, (3) Tigray, (4) western Oromia & western SNNPR, and (5) eastern Oromia & eastern SNNPR. Survey teams that covered Tigray and Oromia included interviewers native or fluent in Tigrigna and Oromiffaa respectively.

### **GIL's Survey Supervision**

The GIL team visited all five teams and attended at least one interview conducted by each of the interviewers. Particular attention was paid to how the interviewers were asking questions, if respondents understood the questions, how they reacted to sensitive questions on income and intra-household decisions, and the interviewers' overall disposition toward the interviewee. The GIL team conducted debriefing meetings with interviewers and collected feedback about the questionnaires, respondent's reactions to the questions, and specific challenges that the survey team was facing. Interviewers received frank feedback and comment on how interviews were being executed and advice about how to improve data quality. The GIL team also assisted the survey teams in addressing respondents' questions about the program, questions about the impact evaluation, and to ensure that the survey firm had provided adequate logistical support for survey teams.

## **4 Descriptive Statistics**

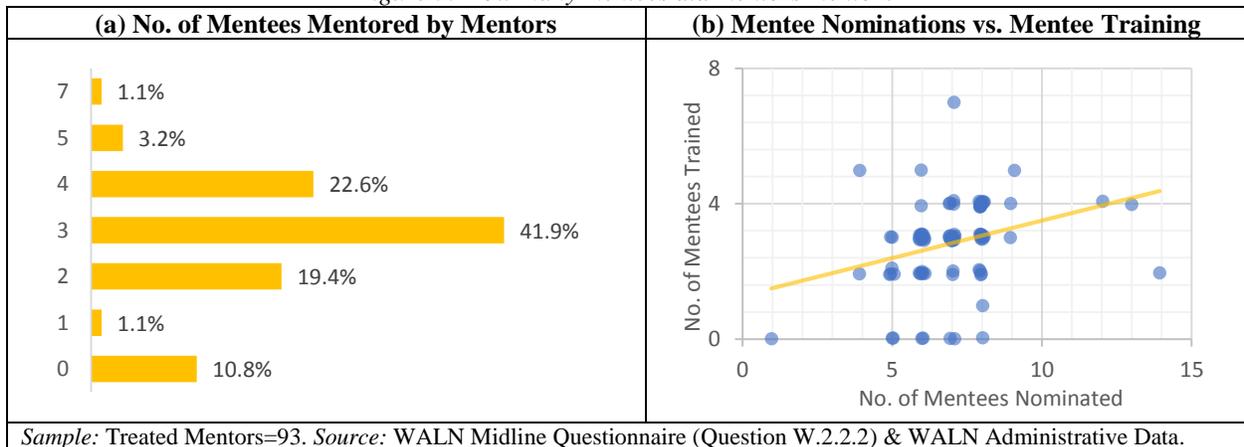
The section discusses some descriptive analysis of four themes that might be important to understand at this intermediate stage of the project: (1) WALN program participation, (2) business knowledge and skills, (3) confidence in other businesses and (4) household headship.

### 4.1 WALN Program Participation

Since both the WALN business training and mentoring activities were completed before the midline data was collected, we included a module about program participation to which treated mentors and mentees were asked to respond. Understanding the extent to which intended beneficiaries actually participated in the program is an important first step, since any impacts that we might hope to identify are contingent on program participation.

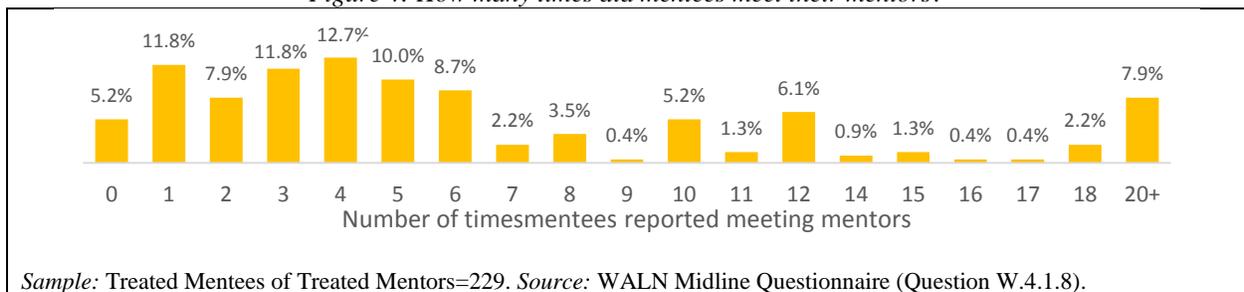
Almost 90% of the mentors assigned to receive the business training treatment actually participated and completed the training. This is very high when compared to the 65% average completion rate that McKenzie and Woodruff found in their 2012 survey of seventeen impact evaluations of business training programs.<sup>6</sup>

Figure 3: How many mentees did mentors mentor?



Treatment-group mentors were invited to provide the mentoring sessions to a randomly selected subset of the mentees they had nominated. All mentors who participated in the business training provided mentoring to at least 1 mentee, and in fact, the 11% of mentors who didn't participate in the business training, didn't provide any mentoring either. Over 80% of the mentors mentored between 2 and 4 mentees (Figure 3a). The number of mentees that was actually trained was correlated with the number of mentees that were originally nominated by the mentors (Figure 3b).

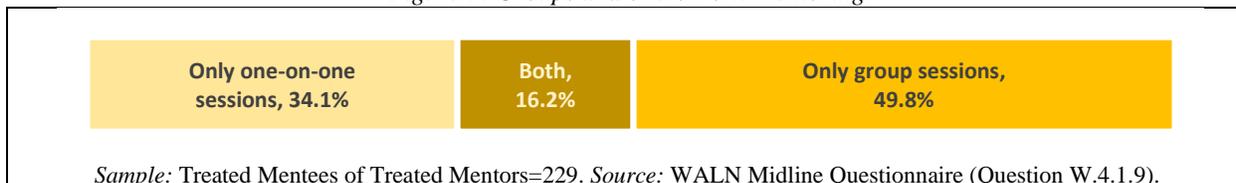
Figure 4: How many times did mentees meet their mentors?



<sup>6</sup> McKenzie, D., & Woodruff, C. (2012, October). What Are We Learning from Business Training and Entrepreneurship Evaluations around the World?. IZA Discussion Paper Series, IZA DP No. 6895.

We also looked at the number of mentoring sessions that mentees received from mentors. The amount of exposure to the mentor may be a channel through which the mentee’s business knowledge might be impacted. 95% of mentees participated in 1 or more sessions, while 40% participated in more than 5 sessions. Clearly, mentoring seems to have been taken seriously by most mentors and mentees. (Figure 4)

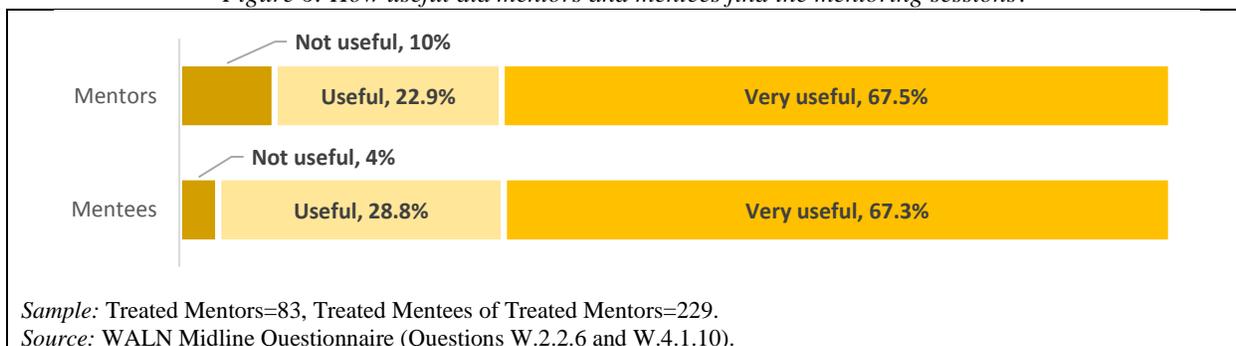
Figure 5: Groups and one-on-one mentoring



The modality of mentoring sessions varied across mentors. About half of the mentees only received mentoring in groups with others, while about a third received exclusively one-on-one mentoring. The remaining 16% received a combination of both (Figure 5).

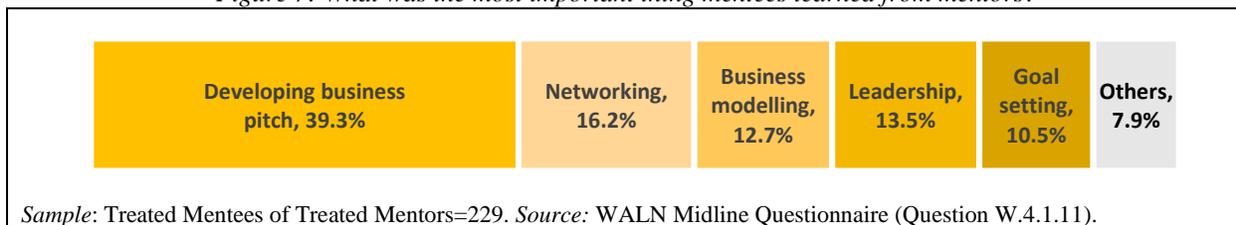
WALN mentors and mentees were asked to what extent they found their participation in the mentoring program useful. Figures 6 shows that over 90% of mentors and over 95% of mentees found the program either *quite useful* or *very useful*.

Figure 6: How useful did mentors and mentees find the mentoring sessions?



Mentees derived value from a number of different factors they learned in the mentoring sessions. “Developing a business pitch” was the most important thing that about 2 out of 5 mentees learned from their mentors. Increased networking, business modeling, leadership skills, and goal setting were other important skills mentees reported as valuable learnings from the mentoring sessions. (Figure 7)

Figure 7: What was the most important thing mentees learned from mentors?

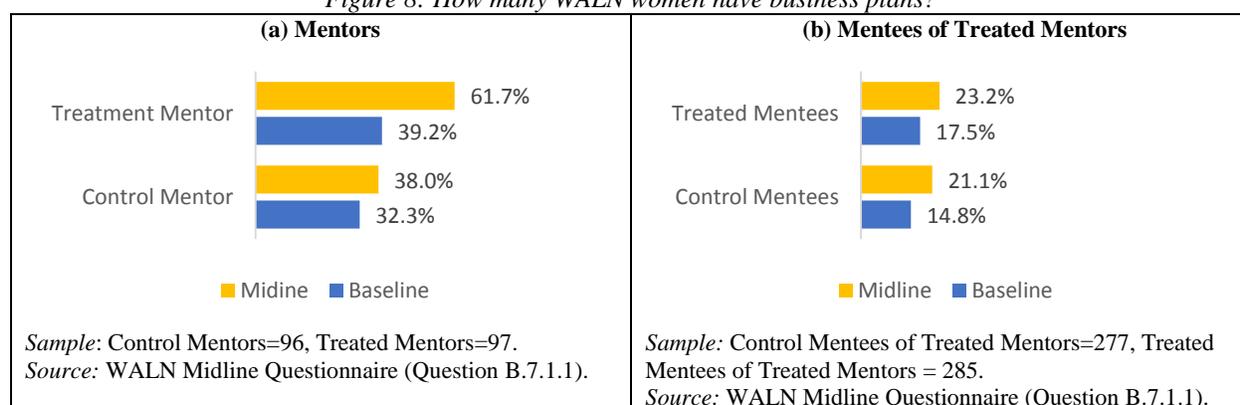


## 4.2 Business Knowledge and Skills

Business knowledge and skills are an important intermediate outcome and intended impact of the WALN program. We discuss some summary statistics of these outcomes in this section and provide some additional analysis of midline data in Section 6 below.<sup>7</sup>

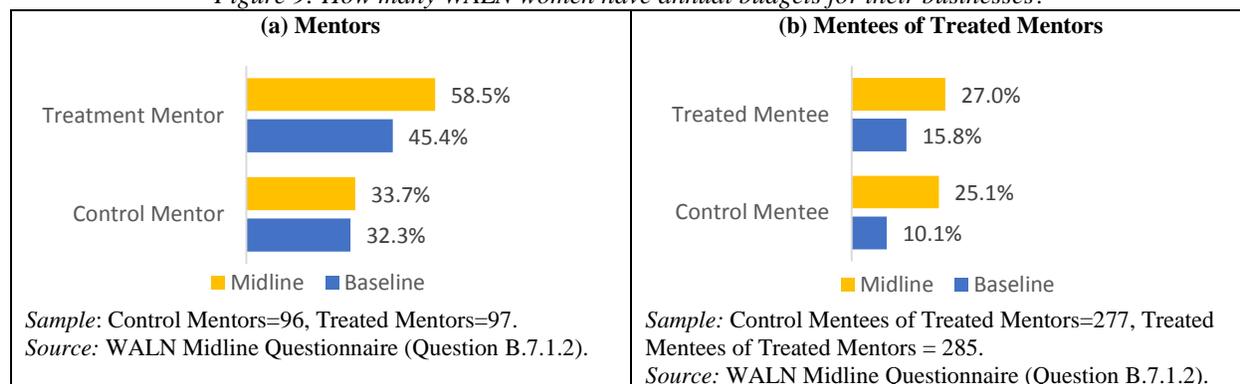
Mentors in both treated and control groups are more likely to have business plans in the midline than they were at the baseline. Figure 8(a) shows that over 20% more treated mentors had business plans at midline compared to baseline, while the increase for the control group was only about 6%. Treated mentees were slightly more likely to have a business plan at baseline than control mentees of treated mentors. At midline, the change from baseline for both groups was very similar, i.e. about 6% (Figure 8b).

Figure 8: How many WALN women have business plans?



Treated mentors were taught how to develop an annual budget during the business training. Treated mentors are over 13% more likely to have an annual budget at midline than they were at baseline, while the control mentors were less than 2% more likely (Figure 9a). Compared to baseline, over 11% more treated mentees of treated mentors report that they maintain annual budgets at midline. There is also a 15% rise in this outcome for control mentees. Midline levels for both groups are similar (Figure 9b).

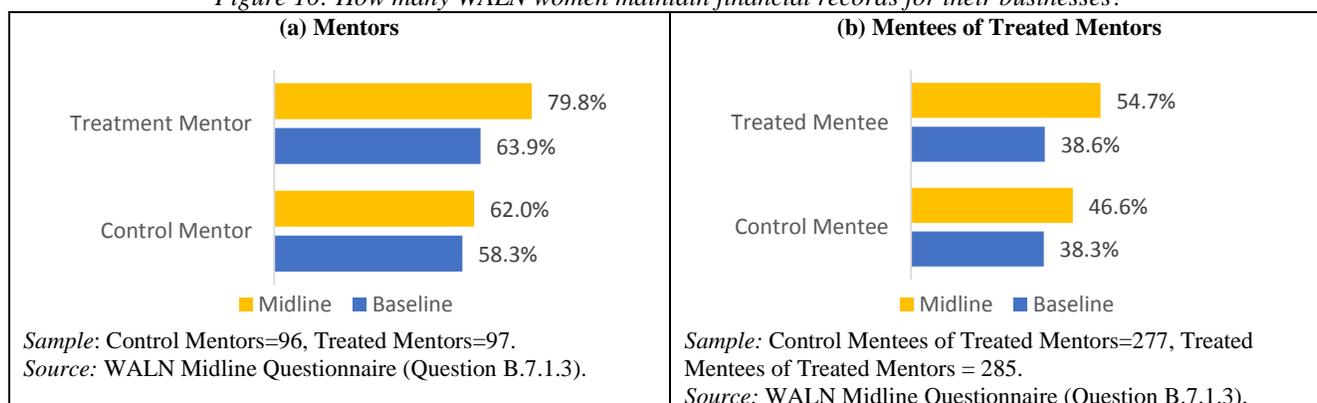
Figure 9: How many WALN women have annual budgets for their businesses?



<sup>7</sup> When interpreting descriptive statistics in this subsection we must approach with caution, since these are preliminary estimates using simple mean comparisons which do not attempt to account for the stratification in the IE design. The discussion in Section 6 uses a more robust analytical strategy.

The business training received by treated mentors also included lessons on financial record keeping. Treated mentors were 16% more likely to report maintaining financial records for their business at midline than they were at baseline. By contrast, the increase was just 4% amongst control mentors who didn't participate in the WALN business training (Figure 10a). Treated mentees of treated mentors were also about 16% more likely to report maintaining financial records at midline than they were at baseline, while control mentees of the treated mentors reported a smaller rise of just over 8% (Figure 10b).

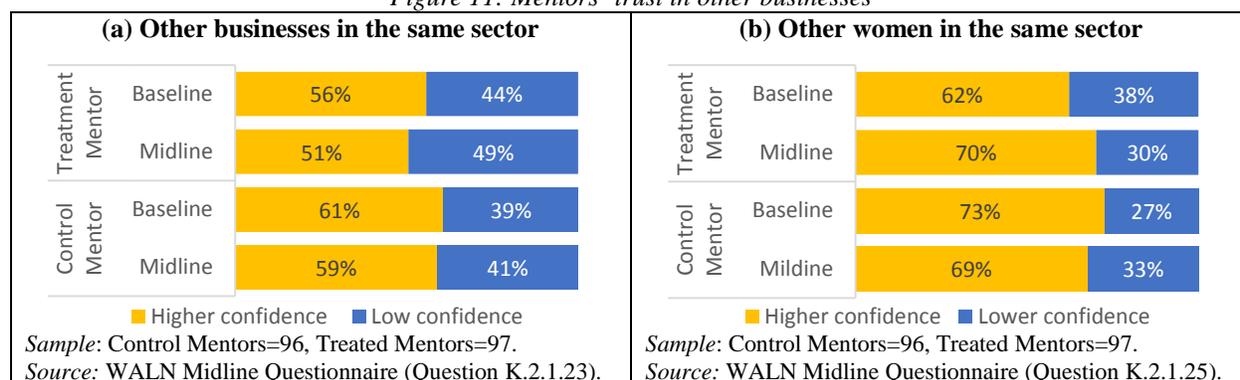
Figure 10: How many WALN women maintain financial records for their businesses?



### 4.3 Confidence in Other Businesses

Confidence and trust are considered an important ingredient in the success of business transactions, and therefore in the success of businesses. Although, we aren't able to measure the trust at the transaction level, we do measure confidence in two groups that respondents are likely to interact with in their business and discuss the results in this section. The two groups we discuss here are: (1) other businesses operating in the sector that the respondent operates in and (2) other business women in that sector. Respondents were asked to rate their confidence in each group on a four points scale.<sup>8</sup> To simplify the presentation here, we generate a binary variable showing *higher confidence* and *lower confidence*.<sup>9</sup>

Figure 11: Mentors' trust in other businesses



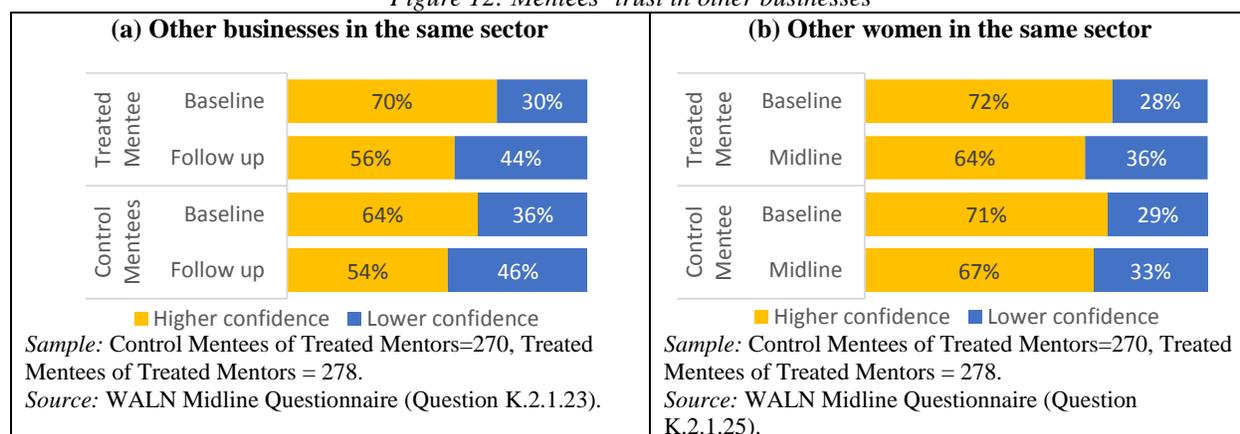
<sup>8</sup> Trust scale: “No confidence at all”=1, “Not a lot of confidence”=2, “Quite a lot of confidence”=3 and “A great deal of confidence”=4.

<sup>9</sup> Binary trust variable: 1 = “Higher Confidence” when the trust scale is either “Quite a lot confidence” or “A great deal of confidence”; 0 = “Lower confidence” when trust scale is either “No confidence at all” and “Not a lot of confidence”

Confidence levels in other businesses between baseline and midline don't shift very much; there is a 5% drop for treatment mentors and 2% for control mentors (Figure 11a). Mentors' confidence in other business women in their sector, however, rises slightly by 8% for treatment mentors while it declines by 4% for control mentors (Figure 11b).

Mentees exhibit a similar trend, with respondents less likely to have higher confidence in other businesses operating in both mentee groups. The data show that treated mentees of treated mentors are 14% less likely to have higher confidence in other businesses in their own sectors, while control mentees of treated mentors see a similar drop of about 10% (Figure 12a).

Figure 12: Mentees' trust in other businesses



Mentees confidence in other business women in their sector shows the opposite trend to the mentors, with moderate reductions of 8% in higher confidence amongst treated mentees of treated mentors, and 4% amongst control mentees (Figure 12b).

These are intriguing results and need additional scrutiny and data collection to unpack whether these are statistically and substantively significant and why the mentees' confidence in other business women seems to be falling, while mentors' confidence is rising. We will collect additional data at the endline to better understand these results.

#### 4.4 Gender and Household Headship

In the baseline survey, 52% of married respondents self-identified as the head of their households. This was large, considering the cultural norms in Ethiopia. The 2011 Ethiopian DHS, for instance, found that 35% of urban and 3% of rural households reported having female household heads.<sup>10</sup>

However, the WALN survey is different from other national household surveys because the question of household headship is explicit.<sup>11</sup> Whereas, DHS and the Ethiopian Socio-economic Survey (ESS) do not

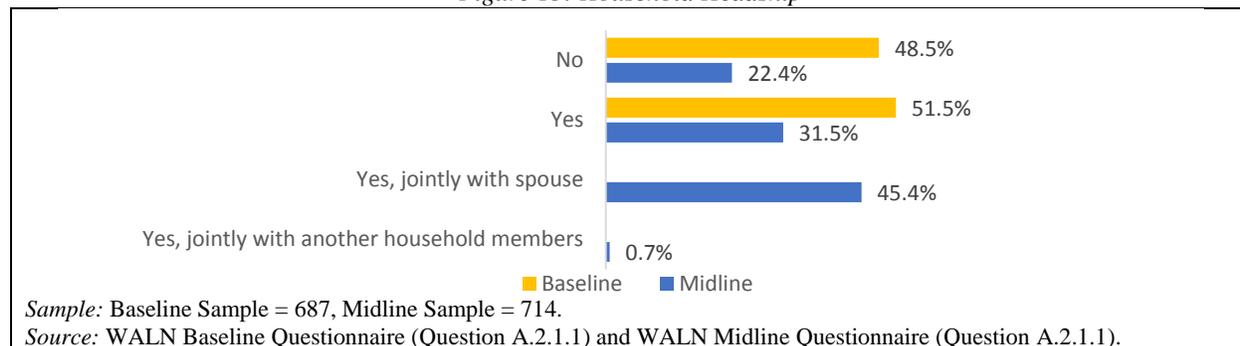
<sup>10</sup> 65% of urban household heads and 77% of rural household heads were male in EDHS (2011). "Ethiopia Demographic and Health Survey". Central Statistical Agency and ICF International: Addis Ababa, Ethiopia and Calverton, Maryland, USA.

<sup>11</sup> The household headship question read "Are you the head of the household?" At baseline, there were two possible responses: "Yes" and "No".

have a separate question on household headship. Rather, the person who is identified as the household head by many of the household members is taken as the head of the household.

There was a possibility that the binary framing of the question might have biased the responses in the baseline. To check if question framing was driving the result, we added two more response options in the midline survey: “Yes, jointly with spouse” and “Yes, jointly with another household member.”

Figure 13: Household Headship



With this new framing, at midline, 20% fewer women report being the sole household head and 26% fewer women report not being the household head. 45% of the women now report that they are jointly the head of their households with their spouse, while less than 1% report that they share headship with another family member (Figure 13). Additional analysis of this data is being conducted, and a separate working paper is planned.

## 5 Baseline Balance of Midline Sample

In the baseline report, we presented balance tests on the baseline cohort of respondents to show that the randomization was effective in creating comparable treatment and control groups for individual, household and business outcomes. Those balance tests showed that there was no significant statistical difference between means for the two groups in either the Mentor or Mentee experiments.

Figure 2 shows that 2% of the baseline mentor sample and 4.8% of baseline sample of mentees of treatment mentors attrited at the midline survey. Additionally, there was slightly greater attrition amongst Control Mentees of Treated Mentors (5.8%) than Treated Mentees (3.7%). Comparing the baseline characteristics of the respondents who participated in our midline survey allows us to confirm that this attrition is not systematic (e.g. if attriting respondents are more educated then midline estimates WALN business training program effects may be smaller). If there was systematic attrition, then we would have to take steps to account for this in the analysis that we present in the following section.

Accordingly, the balance tests were conducted for a set of individual, household, and business characteristics. The tests were conducted using Ordinary Least Squares (OLS) for continuous variables and the Linear Probability Model (LPM) for binary variables. A regression of the variables of interest was run on two different treatment dummy variables: (1) Treatment Mentor (TM) and Control Mentors (CM); (2) Treated Mentees of Treated Mentors (TMTM) and Control Mentees of Treated Mentors (CMTM).

As can be observed in Appendix 2, only two variables are unbalanced for the midline cohort. The number of own businesses is smaller for the treatment mentors than control mentors. The opposite is true for the number of income generating activities although only at a 10% significance level. As for the mentees group, the difference in the number of new customers was found to be statistically significant between the two mentee groups at a 10% significance level.

The midline sample continues to remain largely balanced, in spite of a small amount of attrition between baseline and midline.

## 6 Analytics

This section compares key outcomes of WALN treatment and control groups which reflect how WALN program participants have been affected by their involvement in this program. In addition, baseline balance tables for household and business characteristics of the midline cohort are also presented.

### Hypotheses

The WALN program is hypothesized to affect business and knowledge outcomes in the following ways:

- 1) **Profit and sales:** women exposed to the intervention have greater profit and revenue than women in the comparison group;
- 2) **Business expansion:** women in the treatment group expand their business more than women in the comparison group;
- 3) **Marketing:** program beneficiaries engage in more marketing activities and attract more customers than those in the control group;
- 4) **Knowledge and Skills:** program beneficiaries have greater business knowledge and skills than women in the control group;

### Identification Strategy

While the impact of the program on all the different treatment arms has not been exhaustively explored, the following identification strategy was adopted to analyze the short-term impact of the WALN program on mentors and mentees. We specifically look into:

- 1) **The impact of being a mentor:** Estimate the combined impact of mentors' participation in the leadership training, the mentoring program (where the mentors provide mentorship to mentees) and the broader WALN networking activities by examining the difference in average outcomes between Treatment Mentors and Control Mentors.
- 2) **The direct effect of mentoring:** Estimate the impact of participation in the mentoring program and the broader WALN networking activities by observing the difference in outcomes between Treatment Mentees and Control Mentees of Treatment Mentors.

### Measures

The following measures are utilized to evaluate WALN's preliminary impacts on knowledge and business outcomes of mentors and mentees. These indicators are selected after considering the content of the

program curriculum and the potential link they are likely to have with the different types of interventions in the short run. Some of these outcomes are more likely to be affected in the short run because the midline data were collected just 6 months after the mentors completed business training and almost immediately after the Mentoring sessions concluded.

*Table 3: Outcome Indicators*

<b>Measure</b>	<b>Description</b>
<i>Profit and Sales</i>	
Profit <sup>12</sup>	Self-reported gross profit for the WALN business over the 30 days before the interview.
Constructed Profit	Profit variable constructed by deducting the sum of self-reported business costs from self-reported revenue.
Revenue	Self-reported revenue for the WALN business over the 30 days before the interview.
Costs	The sum of self-reported business costs incurred for the WALN business over the 30 days before the interview.
Earnings	The sum of self-reported earnings from all income generating activities over 12 months before the interview.
<i>Business expansion</i>	
Number of employees	Self-reported number of current employees for the WALN business.
Number of new clients	Self-reported number of new clients for the WALN business over the past 30 days.
<i>Business skills</i>	
Business planning	If the WALN business reported having a business plan this variable was set to one, otherwise zero.
Annual budget	If the WALN business reported having an annual budget this variable was set to one, otherwise zero.
Financial record keeping	If the WALN business reported keeping financial records this variable was set to one, otherwise zero.
Separate business and household money	If the WALN respondent reported maintaining separate business and household accounts this variable was set to one, otherwise zero.

## 6.1 Analytical Approach

To analyze the impact of the WALN program we compare the midline means of the treatment and control groups for key outcome variables listed in the previous sub-section. The Ordinary Least Squares (OLS) regression is used for continuous dependent variables (e.g., Last month's profit). The Linear Probability Model (LPM) and Logit Models are employed when the dependent variable is binary (e.g., Do you have a business plan?). This subsection discusses the analytical approach and the econometric analysis is presented in the following sections.

Outcome variables are regressed on the treatment dummy variable and a set of variables reflecting the sample stratification. The experiment was designed to stratify the sample of mentors into terciles of the number of employees in each region – this resulted in 15 strata in total (5 regions with 3 terciles each)<sup>13</sup>.

<sup>12</sup> Weekly profit data was also collected in baseline. However, it is the thirty days interval that was found to provide less noisy data, and hence, proved more reliable. That is why the thirty days interval was chosen.

<sup>13</sup> This essentially means that treatment and control mentors (or mentees) from the same strata are compared – this is standard in the literature and provides more traction to the statistical analysis. Section 2.2, above, discusses the randomization strategy and provides additional details about the definition of the terciles used as strata.

Estimations with and without WALN business<sup>14</sup> sector fixed effects<sup>15</sup> are shown. Sector fixed effects are included to check for robustness of results when treatment and control firms within the same business sector are compared.

While looking at the impact of the program on mentor outcomes, we cluster Standard Errors at the level of WALN business sector in each region. We chose to cluster the standard errors at this level instead of the strata because the former captures a more natural variation in the data<sup>16</sup>.

We have two models for the continuous variables. The first model does not account for sector fixed effects while the second does. The two specifications are presented in Models 1 and 2 below:

$$Y_{ixs} = \alpha_1 + \beta_1 T_{ixs} + \gamma_x + \varepsilon_{1ixs} \quad \text{Model 1}$$

$$Y_{ixs} = \alpha_1 + \beta_2 T_{ixs} + \gamma_x + \theta_s + \varepsilon_{2ixs} \quad \text{Model 2}$$

In the equations above the subscript  $i$  represents the observation (which is at the individual level), the subscript  $x$  is the strata individual  $i$  is in, and the subscript  $s$  provides the sector information of individual  $i$ 's activity/business.  $Y$  is the vector of outcome variables of interest;  $T$  is the treatment dummy variable and  $\beta$  is the coefficient of interest.  $\gamma_x$  captures the strata fixed effects, while  $\theta_s$ , in Model 2, captures the business sector fixed effects. The error terms,  $\varepsilon_{1ixs}$  and  $\varepsilon_{2ixs}$  are assumed to be normally distributed.

For continuous variables, the estimations are conducted on both the raw and winsorized forms of the data. Winsorization is a standard statistical technique to account for outliers in a sample. In the sample, some of the WALN participants represent very big firms or cooperatives. It is important that the results are not driven by such outliers. To carry out the Winsorization, we regress the dependent variable (e.g. Profit) on strata dummies (15 unique strata). For firms with residuals from this regression that are below the bottom 5% or above the top 5%, we replace the dependent variable with the sum of the predicted value and the residual at bottom 5% or top 5%, respectively. For example, after carrying out the regression of profit on strata dummies, if the 5<sup>th</sup> percentile value of the residual distribution is 130 ETB, then all firms with residuals lower than 130 ETB, would have their profit data replaced by the sum of the predicted value of their profits and 130 ETB.

While analyzing outcomes with binary variables (say, 0 and 1), it is standard to run the Linear Probability model in most cases. The Linear Probability Model (LPM) is essentially the standard OLS model, but with a binary outcome variable. For example, to learn if WALN participants are more likely to adopt a specific financial behavior in their business (e.g. financial record keeping) we can run a regression using the LPM. The results of the regression gives us the change in the likelihood of adopting the specific financial behavior because of the training program.

<sup>14</sup> The WALN business is the firm or business used by the participants to apply to the program.

<sup>15</sup> Again, the idea of a sector fixed effects, is to make sure that treatment and control mentors/mentees within the same business sector are compared. The estimates do not change much without the sector fixed effects.

<sup>16</sup> The WALN business sector is directly reported by the respondent while number of employee terciles are constructed. Hence, using the WALN business sector is a better candidate in allowing us to capture the natural variation in the data.

To check robustness, we also run a Logit Model (with Marginal Effects at Means) which produces remarkably similar results. Without getting too technical, the coefficient of this Logit model gives us the marginal effect of the program on the change in the probability of the binary outcome variable, holding all other variables at their means. The similarity in the size of the effect as well as the statistical significance in both models is indicative of the robustness of the results.

However, there are slight differences between the two models for some of the financial behavior variables. For example, while both the LPM and the Logit models indicate an increase in the probability of buying raw materials for credit by around 9% for treatment mentors, the former has a p-value of 0.11 while the latter is significant at 10% level. While small, there is some difference in the statistical significance. In this particular context, we can infer that, on average, treatment mentors appear to increase raw material purchase on credit, with some statistical significance.

## 6.2 Discussion of results

### Mentors experiment

A comparison of means between treatment and control mentors was conducted for a group of business and knowledge outcome variables. The results show that there is no statistically significant difference in means between the two groups of mentors in any of the direct business outcomes such as revenue, costs, earnings, and profit. The estimation was also conducted on constructed profit which is the difference between reported revenue and the sum of reported costs of the WALN business. However, the estimation results reveal that there is no treatment effect on constructed profit. This shows that the results are not sensitive to the type of profit variable under consideration. Neither did the business training intervention have a statistically significant effect on the number of employees, which was used to capture business expansion. The estimations were conducted both on the raw and winsorized forms of the outcome variables. As can be observed from Table 4 in Appendix 1, the results are robust to the transformations made on the outcome variables and to the addition of sector fixed effects.

In contrast, the treatment was found to have a statistically significant effect on the number of new customers which was used to account for the women's marketing efforts, although only at 10% significance level. Women in the treatment mentors group were found to have a greater number of new customers on average when compared to women in the control mentors group. The level of statistical significance improves when sector fixed effects are controlled for, and outliers are winsorized.

We also looked into the impact of the business training intervention on mentors. The results of the linear probability estimation show that treatment mentors fare better in terms of the direct knowledge outcomes than their counterparts in the control group. Specifically, treatment mentors are 22% more likely to have a written business plan than control mentors. The same holds true for the annual budget. Although at a smaller scale, treatment mentors were also found to have a greater probability of keeping financial records. Treatment mentors are 15% more likely to hold financial records than women in the control group. Business money management, which captures whether the woman separates her business and

household money, is one of the knowledge and skill outcome indicators. However, the business training intervention does not have a statistically significant effect on this outcome indicator.

As can be observed from Table 5 in Appendix 1, the results are robust to the type of limited dependent variable estimation method used. The effect remains to be statistically significant when Logit is used.

### **Mentees of Treated Mentors Experiment**

A comparison of means in the business and knowledge outcome variables was also conducted for the mentees experiment which compares the treated mentees with control mentees of treated mentors. The results of the mean comparisons show that the treatment impact is statistically significant on the winsorized form of reported profit at 5% significance level. This effect is maintained regardless of the inclusion of sector fixed effects in the estimation. As can be observed from Table 6 in Appendix 1, treatment mentees of treated mentors have reported around ETB 600 more profit on average than the control mentees of treated mentors.

Moreover, the difference in mean revenue between the two mentee groups in its winsorized form was found to be statistically significant at a 10% significance level. Treated mentees have greater revenue on average when compared to their counterparts in the Control Mentees of Treated Mentors (CMTM) group. However, this relationship disappears once sector level fixed effects are accounted for.

The mentoring treatment intervention was not found to have a statistically significant effect on the remaining variables capturing direct business outcome, business expansion, and marketing efforts of the outcome variable transformation and the inclusion of sector fixed effects. Table 7 in Appendix 1 presents the estimation results.

Unlike the case for the mentors' group, the effect of the mentoring program was not statistically significant for most of the knowledge and skill outcome variables. However, a positive effect is observed on financial record keeping at a 10% significance level. Treatment mentees were found to have 8% more probability of having a financial record when compared to control mentees of treatment mentors.

## **7 Conclusion**

The WALN program is an interesting departure from the standard business training model. Under a stratified randomized control trial framework, experienced business women who are involved in agriculture-related businesses are given formal business training. But the more innovative part in this evaluation design is the inclusion of a second stage training, where a random selection of women mentees within the social and business network of mentors, receive customized mentoring. There are important implications for the evaluation of this project, particularly, in the context of the transmission of business knowledge and best practices across social and business networks and the efficacy of informal mentorship programs.

However, the results reported in this report are very preliminary and should be interpreted with the following factors in mind. Firstly, this report is based on data collected within six months of the first stage training for the mentors and almost immediately after the second stage training of the mentees. Thus, the

effects on the outcomes we looked into are very short-term. Secondly, business habits and practices take some time to change. It is likely to take even longer for such changes to be reflected in earnings and business outcomes. Thirdly, after incorporating the endline data in our analysis, we will have higher statistical power while making inferences about the causal direction and magnitude of the program effects.

Still, we have some preliminary insights into the behavior change associated with the training. For example, we find that treatment mentors, when compared to control mentors at midline, are more likely to have a written business plan, to have an annual budget and to maintain formal financial record keeping. But the treatment mentors do not exhibit any statistically significant increase in their business outcomes such as profits and earnings.

The treatment mentees of treated mentors, on the other hand, do not exhibit any difference from the control mentees of treated mentors in terms of the adoption of the business practices mentioned above. However, they report a statistically significant increase in their reported profits, when we correct for the outliers in the sample. It is possible that mentees (compared to their mentors) exhibit a stronger effect on their business performances because of level effects. At baseline, the mentors have bigger businesses and were earning higher income compared to the mentees. It could be easier to make improvements to smaller businesses that can quickly reflect on profits. Again, we want to be cautious not to draw any firm conclusion because of the reasons we already stated.

We are preparing a working paper which will provide a more complete and rigorous analysis of the available data. This will allow us to make stronger causal claims about the potential effect of both the first stage training on the mentors and the second stage mentorship. Moreover, potential channels of the intervention effects will also be looked into in detail. For example, it is possible that mentees are more likely to benefit from the local business knowledge (e.g., which supplier provides better quality/cheaper raw materials) of the mentors compared.

## Appendix 1. Estimation Results

Table 4: Business Outcome Variables (Mentor)

Business outcomes	OLS Model 1		OLS Model 2		n
	Raw	Wins (5%)	Raw	Wins (5%)	
Profit	-2450.90 (0.60)	-228.66 (0.82)	-2650.12 (0.61)	-540.76 (0.54)	177
Revenue	-83,146.04 (0.16)	83.91 (0.99)	-99,742.04 (0.13)	-1,421.21 (0.78)	179
Earnings	-1,325,704.00 (0.36)	5,581.66 (0.76)	-1,994,980.00 (0.28)	-5,202.41 (0.78)	182
Costs	-55144.28 (0.24)	-7188.80 (0.33)	-71730.05 (0.19)	-8,800.58 (0.31)	183
Constructed Profit	-30,268.97 (0.21)	-1,993.70 (0.74)	-30,817.60 (0.23)	-1,926.26 (0.75)	179
Number of customers	5.03 (0.11)	2.50 ** (0.03)	4.99 * (0.08)	2.63 ** (0.03)	182
Number of employees	-0.15 (0.93)	0.54 (0.33)	-1.14 (0.55)	0.52 (0.30)	182
Strata Fixed Effects	Yes	Yes	Yes	Yes	
Sector Fixed Effects	No	No	Yes	Yes	
Clustered Standard Errors <sup>a</sup>	Yes	Yes	Yes	Yes	

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01. P-values in parenthesis.

Source: WALN Midline Data (Midline Questionnaire Module B).

Notes: (a) Standard Errors are clustered at (Region\*Sector) level.

Table 5: Business Knowledge and Skill Outcomes (Mentors)

Business knowledge and skills outcomes	Linear Probability Regression		Logit Regression <sup>a</sup>	
		n		n
Business plan	0.22** (0.01)	182	0.22*** (0.00)	172
Annual budget	0.22** (0.018)	182	0.21*** (0.00)	181
Financial record keeping	0.15** (0.03)	182	0.15** (0.02)	167
Business money management	-0.1 (0.14)	182	-0.11 (0.10)	154
Strata Fixed Effects	Yes		Yes	
Sector Fixed Effects	Yes		Yes	
Clustered Standard Errors <sup>b</sup>	Yes		Yes	

\*<0.10, \*\*p<0.05, \*\*\*p<0.01. P-values in parenthesis.

Source: WALN Midline Data (Midline Questionnaire Module B).

Notes: (a) Logit coefficient showing the marginal effect of the program on the change in the probability of the binary outcome holding all other variables at their means. Fewer observations are reported because of a large number of fixed effects included in the model that leads to cells containing only treated or only control cases. Such cells are dropped when making logit estimations. (b) Standard Errors are clustered at (Region\*Sector) level.

Table 6: Business Outcome Variables (Mentees of Treated Mentors)

Business outcomes	OLS Model 1		OLS Model 2		n
	Raw	Wins (5%)	Raw	Wins (5%)	
Profit	-1,118.22 (0.76)	640.61** (0.03)	-2,211.05 (0.61)	607.17** (0.05)	496
Revenue	17,623.39 (0.22)	3,394.21* (0.09)	9,739.34 (0.38)	2,801.86 (0.17)	502
Earnings	19,064.81 (0.55)	-10,730.12 (0.59)	13,858.19 (0.64)	-13,833.39 (0.51)	518
Costs	3,091.85 (0.60)	1,143.58 (0.67)	-701.38 (0.91)	66.25 (0.98)	520
Constructed profit	12,566.82 (0.22)	2,234.24 (0.52)	7,895.12 (0.33)	1,709.23 (0.65)	502
Number of new customers	-4.46 (0.11)	-1.28 (0.12)	-4.60 (0.11)	-1.33 (0.10)	511
Number of employees	0.18 (0.79)	0.15 (0.54)	-0.10 (0.89)	0.10 (0.70)	519
Strata Fixed Effects	Yes	Yes	Yes	Yes	
Sector Fixed Effects	No	No	Yes	Yes	
Clustered Standard Errors <sup>a</sup>	Yes	Yes	Yes	Yes	

\*p<0.10, \*\*p<0.05, \*\*\*p<0.01. P-values in parenthesis.

Source: WALN Midline Data (Midline Questionnaire Module B).

Notes: (a) Standard Errors are clustered at (Region\* Sector) level.

Table 7: Business Knowledge and Skill Outcomes (Mentees of Treated Mentors)

Knowledge and skill outcomes	LPM Model 2		Logit Model 2 <sup>a</sup>	
		n		n
Business plan	0.01 (0.75)	518	0.03 (0.71)	304
Annual budget	0.02 (0.67)	518	0.03 (0.61)	334
Financial record keeping	0.08* (0.09)	518	0.09* (0.07)	424
Business money management	-0.03 (0.46)	518	-0.06 (0.35)	310
Strata Fixed Effects	Yes		Yes	
Sector Fixed Effects	Yes		Yes	
Clustered Standard Errors <sup>b</sup>	Yes		Yes	

\*<0.10, \*\*p<0.05, \*\*\*p<0.01. P-values in parenthesis.

Source: WALN Midline Data (Midline Questionnaire Module B).

Notes: (a) Logit coefficient showing the marginal effect of the program on the change in the probability of the binary outcome holding all other variables at their means. Fewer observations are reported because of a large number of fixed effects included in the model, that leads to cells containing only treated or only control cases. Such cells are dropped when making logit estimations. (b) Standard Errors are clustered at (Region\*Sector) level.

## Appendix 2. Baseline Balance Tables

Table 8: Baseline Balance for Midline Survey Respondents Cohort (Mentors)

Outcomes <sup>a</sup>	Coefficient	Standard Errors	<i>n</i>
<i>Individual and Household Characteristics</i>			
Age (years)	-0.17	1.33	193
Head of household = 1	0.00	0.07	193
Married = 1	0.06	0.07	193
Household size	-0.17	0.41	193
Number of children	-0.01	0.28	193
Primary school not complete = 1	-0.10	0.07	193
Primary school complete = 1	0.03	0.07	193
Secondary school complete = 1	0.08	0.05	193
Higher Education Certificate = 1	0.00	0.04	193
Any University Education = 1	-0.01	0.05	193
<i>Business Characteristics</i>			
Revenue (ETB)	-30,456.00	56,086.00	190
Profit (ETB)	-2,219.00	1,637.00	192
Profitability <sup>b</sup>	-0.18	0.16	141
Costs (ETB)	-75,129.00	12,6293.00	193
Constructed Profit <sup>c</sup> (ETB)	40,560.00	73,880.00	190
Annual Earnings (ETB)	12,380,000.00	12,760,000.00	157
Number of registered businesses	0.15	0.10	193
Number of own businesses	-0.11***	0.04	193
Number of new customers	1.98	3.46	193
Number of employees	-3.53	4.40	193
Number of male employees	-0.16	0.20	193
Number of female employees	-0.19	0.22	193
Number of income generating activities	0.20*	0.12	193
<i>Sector of WALN Business</i>			
Storage & warehousing sector = 1	0.00	0.06	193
Retail sector = 1	0.04	0.07	193
Food processing sector = 1	-0.07	0.07	193
Livestock sector = 1	-0.02	0.07	193
Growing crops = 1	0.01	0.07	193

\* p<0.10, \*\*p<0.05, \*\*\*p<0.01

Source: WALN Baseline Data.

Notes: (a) The outcomes were regressed on each of the treatment dummy variables, (b) Profitability is the ratio of profit to gross revenue, (c) Constructed profit is the difference between gross revenue and sum of business costs (expenditure).

Table 9: Baseline Balance for Midline Survey Respondents Cohort (Mentees of Treated Mentors)

Outcomes <sup>a</sup>	Coefficient	Standard Errors	n
<i>Individual and Household Characteristics</i>			
Age (years)	-0.79	0.83	561
Head of household = 1	0.05	0.04	562
Married = 1	0.04	0.04	562
Household size	-0.04	0.20	562
Number of children	-0.06	0.16	562
Primary school not complete = 1	-0.05	0.04	562
Primary school complete = 1	0.03	0.04	562
Secondary school complete = 1	0.04	0.03	562
Higher Education Certificate = 1	-0.01	0.03	562
Any University Education = 1	0.00	0.01	562
<i>Business Characteristics</i>			
Revenue (ETB)	29,162.00	25,458.00	557
Profit (ETB)	1,968.00	1,962.00	556
Profitability <sup>b</sup>	0.03	0.02	418
Costs (ETB)	7,545.00	13,274.00	562
Constructed Profit <sup>c</sup> (ETB)	21,486.00	17,711.00	557
Annual Earnings (ETB)	-644,535.00	740,557.00	544
Number of Registered Businesses	0.00	0.05	562
Number of Own Businesses	0.00	0.03	562
Number of New Customers	-4.09*	2.41	562
Number of Employees	0.76	0.89	562
Number of Male Employees	0.22	0.14	562
Number of Female Employees	-0.05	0.17	562
Number of Income Generating Activities	0.00	0.05	562
<i>Sector of WALN Business</i>			
Storage & warehousing sector = 1	0.01	0.03	562
Retail sector = 1	-0.04	0.04	562
Food processing sector = 1	0.04	0.04	562
Livestock sector = 1	0.04	0.04	562
Growing crops = 1	0.01	0.04	562

\* p<0.10, \*\*p<0.05, \*\*\*p<0.01

Source: WALN Baseline Data.

Notes: (a) The outcomes were regressed on each of the treatment dummy variables, (b) Profitability is the ratio of profit to gross revenue, (c) Constructed profit is the difference between gross revenue and sum of business costs (expenditure).