



ETHIOPIA GENDER DIAGNOSTIC REPORT

PRIORITIES FOR PROMOTING EQUITY

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Gender Innovation Policy Initiative for Ethiopia

The Gender Innovation Policy Initiative for Ethiopia (GIPIE) is a country-level unit of the Africa Gender Innovation Lab (GIL) based in the World Bank Ethiopia Country Office. GIL conducts impact evaluations of development interventions and leads policy research to generate evidence on how to close gender gaps in earnings, productivity, assets, and agency. With these findings, GIL equips project teams and policy makers to design innovative and scalable interventions to address gender inequality. The GIL team is currently working on over 60 impact evaluations in nearly 30 countries with the aim of building an evidence base with lessons for the region.

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INTRODUCTION

Ethiopia has experienced remarkable economic success in recent years. In the past decade, its average annual growth rate far exceeded the regional average, at slightly over 10 percent relative to a regional 5 percent. Agriculture grew at 7 percent, services at 12 percent, and industry at 21 percent.¹

Despite significant economic growth, however, women continue to face significant barriers in the workforce. Women experience high rates of unemployment (50 percent), seasonal employment (37 percent), and temporary employment (13 percent).² Women are also less likely than men to be paid for their work: over half of all women engaged in the agricultural sector, for example, receive no payment. Similar trends exist in other industries like small-scale manufacturing, where 58 percent of female workers are unpaid family workers, relative to 40 percent of male workers.³

Furthermore, for women active in the workforce, their productivity lags behind that of men. Female farmers have lower rates of agricultural productivity than their male counterparts, and in entrepreneurship, female-owned firms underperform those owned by men in an array of critical dimensions including profitability, survival rate, average size, and growth trajectory.⁴ In a study of small- and medium-sized enterprises in Ethiopia, researchers found that while female-owned

firms account for only 44 percent of firms, they make up nearly 70 percent of failed businesses.⁵

The unmet potential of women in the workforce is intrinsically linked to a lack of opportunities for women in education, health, and human rights. Women are less literate, suffer from poorer health outcomes, and have fewer basic rights than men. These wide and pervasive gender gaps hinder not only female livelihoods, but also the potential for poverty alleviation and growth on a national level.

This report, the *Ethiopia Gender Diagnostic*, presents evidence on the mechanisms underlying gender gaps in the Ethiopian workforce. Using data from the 2011–2016 Ethiopia Socioeconomic Surveys, this report provides a detailed understanding of the constraints faced by female farmers, entrepreneurs, and employees. To that end, the diagnostic makes four key contributions:

First, this report provides an overview of the labor force in Ethiopia and identifies the factors that predict *whether, how much, and in what sector* an individual works. Part I reveals that gender, among other factors, serves as a strong predictor of workforce participation. A simple average indicates that women are 17 percent less likely than men to participate in the labor force. This disparity widens to 29 percent when controlling for demographic factors.

Women are also less likely than men to be paid for their work: over half of all women engaged in the agricultural sector, for example, receive no payment.

Second, this report uses Oaxaca-Blinder decompositions to measure and account for gender gaps in economic outcomes in agriculture, self-employment, and wage labor. Part II shows that women fare worse off in agricultural productivity, business revenues, and hourly wages than men due largely to differential access to productive resources like credit, assets, inputs, and education.

Third, this report identifies the links between labor market skills, social norms, and gender gaps in the Ethiopian workforce. In doing so, Part III explores the mechanisms that hinder Ethiopian women from accessing or help them to identify relevant resources and opportunities.

Fourth, part IV provides policy makers with a menu of innovative programming examples. Virtually all of the innovations presented in part IV have the potential to be adapted to the Ethiopian context.

BOX 1

Ethiopia Socioeconomic Surveys

Implemented by the Central Statistical Agency (CSA) in collaboration with the World Bank's Living Standards Measurement Study Integrated Surveys on Agriculture (LSMS-ISA) team, the Ethiopia Socioeconomic Survey (ESS) produces comprehensive, high-quality data on agriculture, entrepreneurship, employment, interinstitutional collaboration, welfare indicators, and socioeconomic characteristics across Ethiopia.

The ESS was implemented in three waves: 2011–2012, 2013–2014, and 2015–2016. Data for the latter two waves are nationally representative, allowing for a rich, detailed analysis on the links between gender gaps in the workforce and socioeconomic factors in Ethiopia. For additional information on sampling, please refer to appendix A1. Survey reports provided by LSMS, available through <http://microdata.worldbank.org/index.php/catalog/2053>, provide more granular details.

Part I

An Overview
of Women in
the Workforce

Labor Supply in Ethiopia

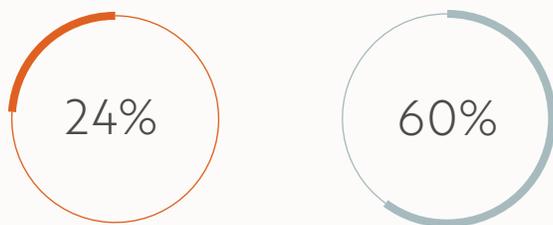
This report defines *working-age* individuals as individuals age 14 or above, in accordance with The Labor Proclamation of 2004, and *working* individuals as any working-age individual who spent one hour or more in the past week on agricultural activities; non agricultural business activities; casual, part-time, or temporary labor; or any other work for which they received a wage or salary.

Part I uses the Ethiopia Socioeconomic Survey (ESS) third wave data (2015–2016), which represent 13,316 working-age individuals, of whom 52 percent are women. Some 53 percent of working-age people and 55 percent of working-age women work. Relative to working men, working women in our data have, on average, lower levels of education, are less likely to be widowed, separated, or divorced, and are less often the head of household.

Illiteracy Rate

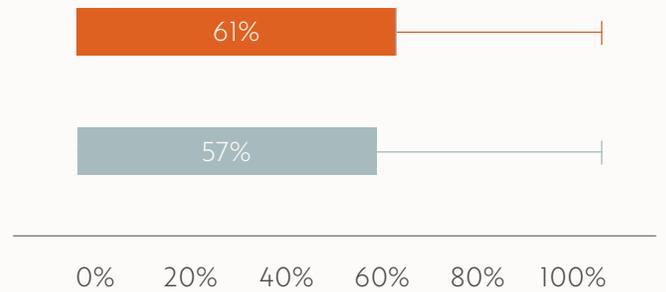


Household Head

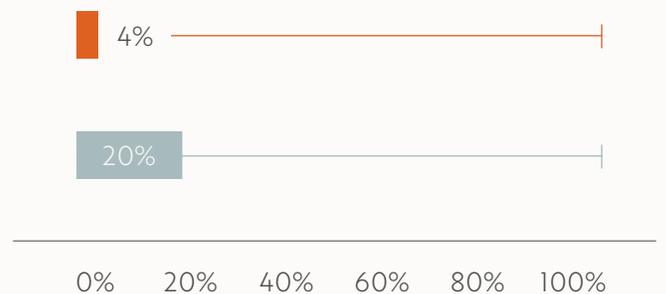


Female Male

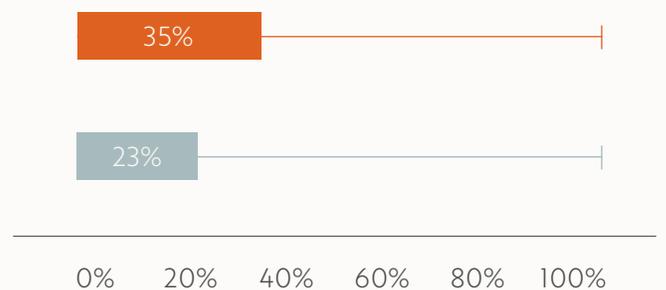
Married



Widowed, Separated, or Divorced



Single



Gender serves as a strong predictor of workforce participation in Ethiopia. A simple average indicates that women in our data are 17 percent less likely than men to participate in the labor force.ⁱ This disparity widens to 29 percent when taking into account other factors such as age, education, and household wealth. Among individuals active in the workforce, a gender gap of 4.4 hours exists: while men work 31 hours per week, on average, women work only 27. Table 1 displays individual and household characteristics that, holding all else constant, predict whether an individual works and the extent to which he or she works.ⁱⁱ Factors highlighted in orange positively predict outcomes, while factors highlighted in blue inversely predict outcomes.ⁱⁱⁱ Factors that are not highlighted do not predict the outcome.

Table 1 reveals five key factors that strongly predict workforce participation. First, age is critical: the probability that a working-age individual works increases with every additional year of life. This trend is more prominent among women than men. Second, education matters: women with a university degree are 16 percent more likely to work than their male counterparts. Third, accessing formal credit is

relevant: belonging to a household that has received formal credit is associated with a higher likelihood that an individual works. Women in households that have received formal credit work more hours than men from such households. Fourth, household headship matters: household heads are more likely to work than non-household heads, and female household heads work 3.2 more weekly hours, on average, than their male counterparts. Fifth, marital status is pertinent: married women work 4.2 fewer hours per week than married men.

Figures 1 and 2 display the breakdown of sectors in which working individuals participate over time.^{iv} Based on the data, the majority work in agriculture, followed by non farm enterprise, and wage employment.^v Women make up roughly 40 percent of the agricultural sector and 30–40 percent of the wage sector. Meanwhile, women represent the majority of non farm enterprise operators, particularly in the rural and small-town areas during 2011–2012. About 3 percent of women work in more than one sector, with most of these individuals spending roughly half of their time in non farm enterprise and the other half in either the wage or agricultural sectors.

i This section draws upon ESS third wave labor and time use data (2015–2016).

ii Factors held constant in the remainder of part I include age, household headship, marital status, education level, child dependency ratio, whether the individual was ill or injured in the past month, household formal credit, household wealth, household size, and household geographic location.

iii For example, in column 1, as an orange factor holds true and/or increases, the likelihood that an individual will work at least one hour increases, holding all else constant. Meanwhile, as a blue factor holds true and/or increases, the likelihood that an individual will work at least one hour decreases, holding all else constant.

iv To calculate this, we use the total number of hours that a respondent reported working in each category, calculate the proportion of his or her time worked in each sector, then identify if he or she worked mostly in agriculture, entrepreneurship, or wage employment. If the person worked in equal proportions in two or more sectors, then he or she falls into the category “more than one sector.”

v Agricultural activities include livestock- and fishing-related activities, either for sale or for household use. Non farm enterprise activities include all non agricultural or non fishing household businesses, big or small, whether for an entrepreneur or for the household. Wage employment is any work for a wage, salary, commission, or any payment in kind, excluding temporary employment.

TABLE 1

Factors That Explain If and How Much an Individual Works

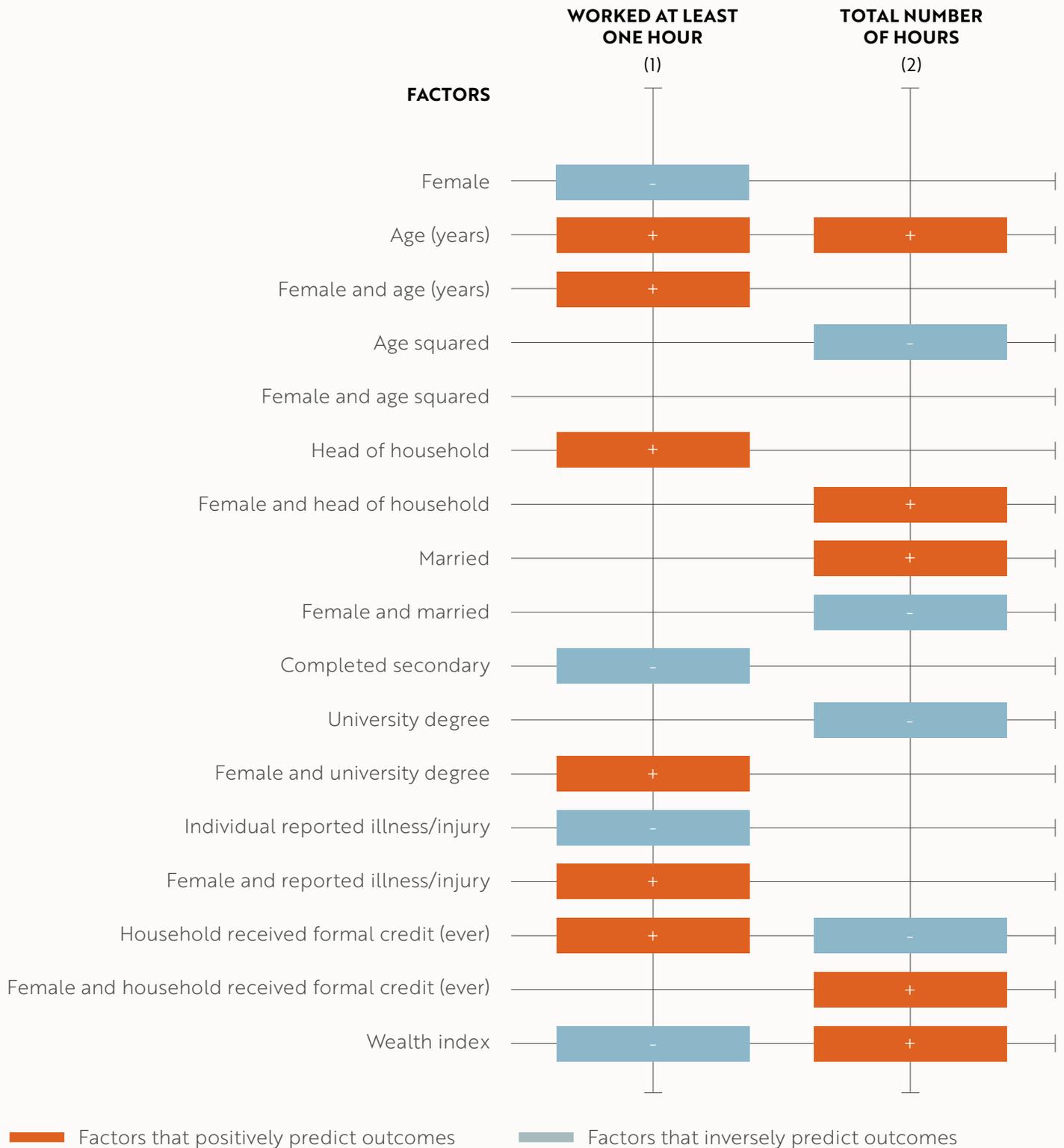
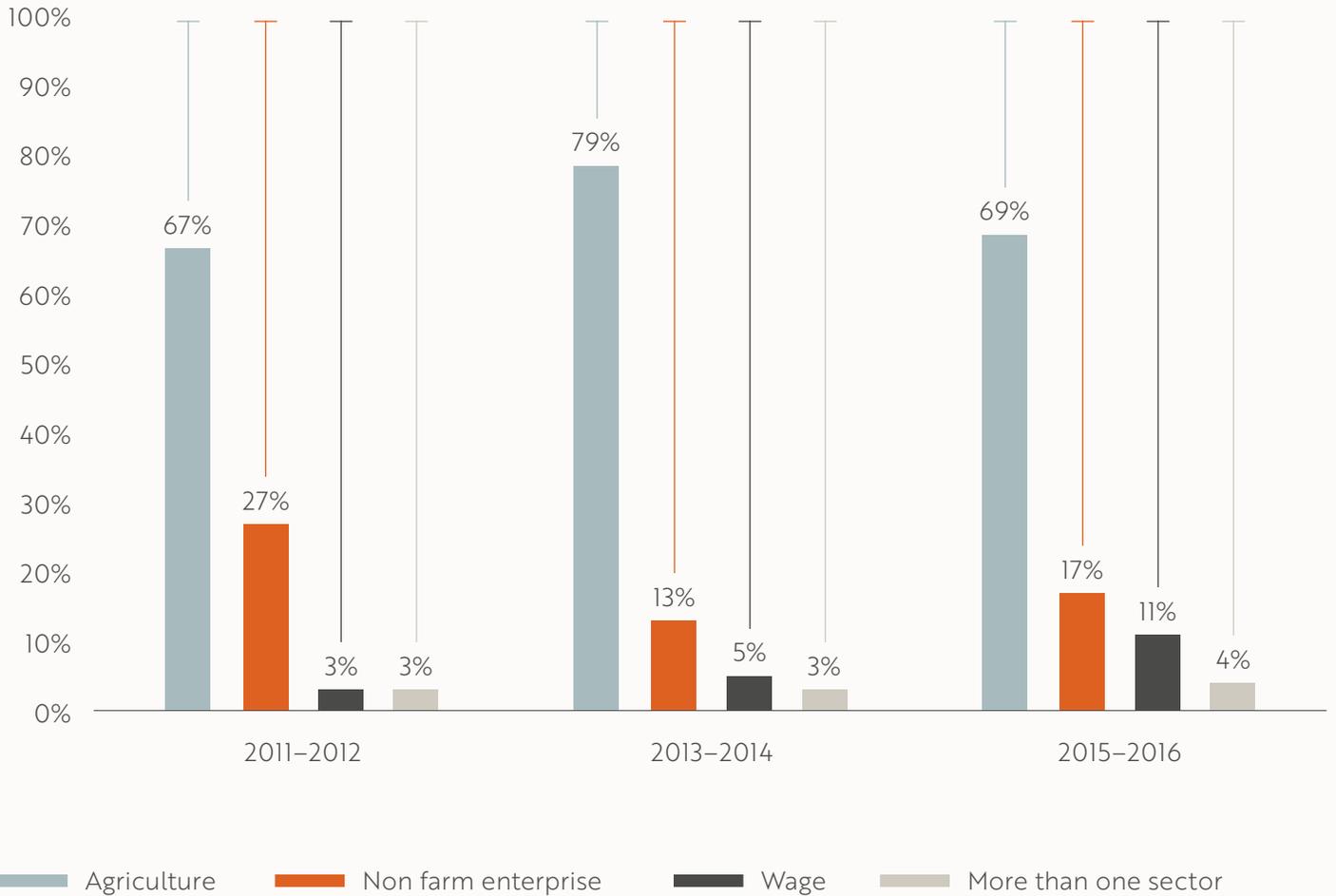


FIGURE 1

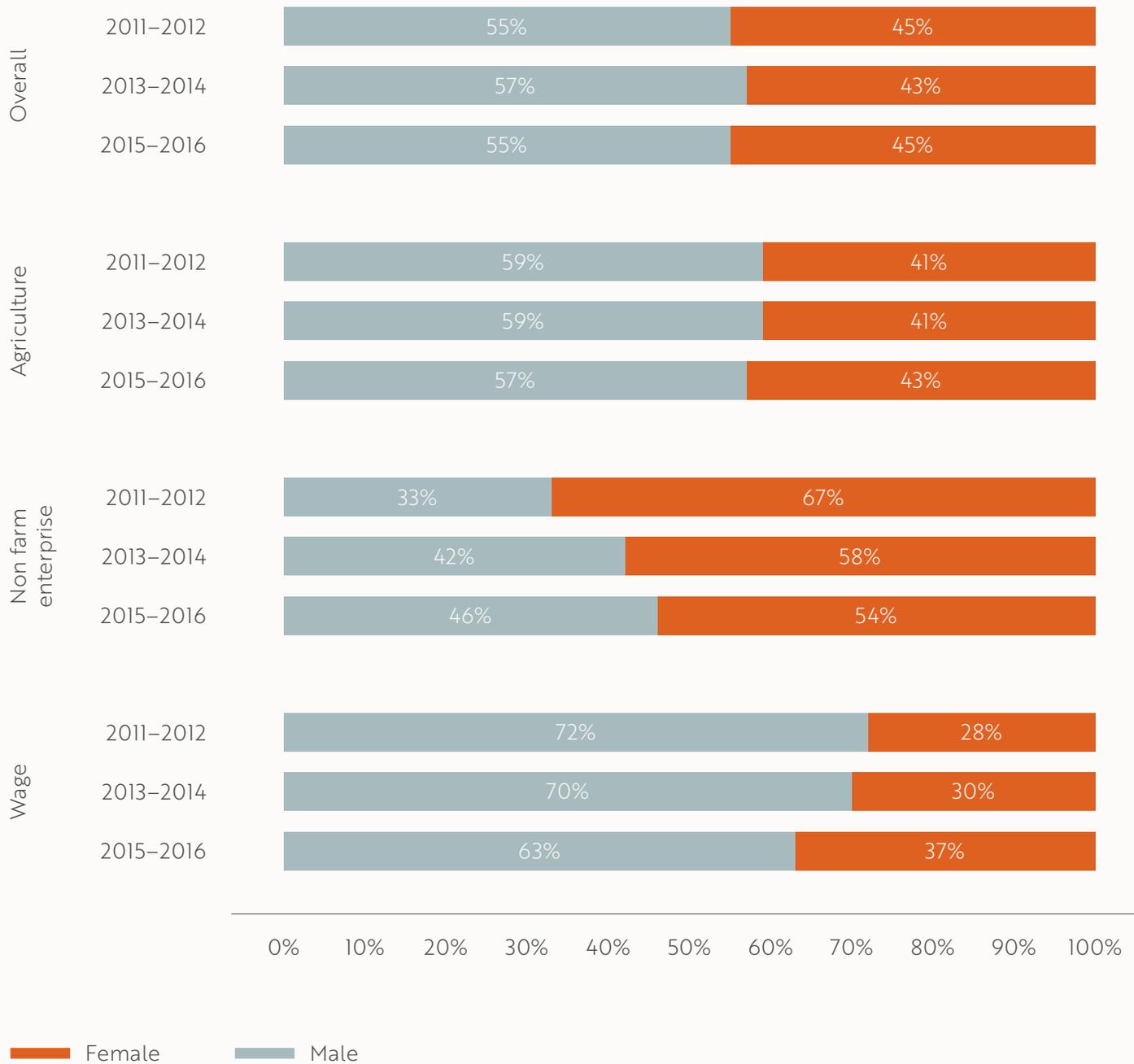
Labor Participation by Sector



Note: To calculate this, we use the total number of hours that a respondent reported working in each category, calculate the proportion of his or her time worked in each sector, then identify if he or she worked mostly in agriculture, entrepreneurship, or wage employment. If the person worked in equal proportions in two or more sectors, then he or she falls into the category "more than one sector."

FIGURE 2

Women's and Men's Labor Participation by Sector



Part II

Measuring the Gender Gaps

Women active in the workforce still fare worse than men in agricultural productivity, business revenues, and hourly wages in Ethiopia. To understand the factors that help explain these gaps in economic outcomes, the analysis in part II uses Oaxaca-Blinder decompositions to determine whether differential access to resources like credit, assets, inputs, and education—or differences in the returns to these resources—drive the gaps in women’s economic empowerment.

AGRICULTURAL PRODUCTIVITY

In Ethiopia, roughly 40 percent of GDP comes from the agricultural sector, which employs nearly 80

percent of the population. The vast majority of agricultural production, 90 percent, comes from the work of 12 million smallholder households.¹³ Several key constraints, however, inhibit agricultural productivity in Ethiopia and throughout Africa. Population growth, climate variability, weak land tenure systems, and low fertilizer use degrade arable land.¹⁴ Poor transport infrastructure limits access to markets, information, and inputs. Inconsistent or low yields hinder smallholders’ ability to commercialize and participate in global supply chains. Of particular relevance to smallholder farmers, limited access to credit through the formal financial system inhibits their adoption of new technologies and innovations.

BOX 3

Background and Macroeconomic Context

With a population of 105 million and a population growth rate of 2.85 percent, Ethiopia is the second largest country on the African continent.⁶ Ethiopia’s average annual growth rate of slightly over 10 percent in the past decade has far exceeded the regional average of 5 percent. Services grew at 12 percent, industry at 21 percent, and agriculture at 7 percent.⁷ While Ethiopia remains predominantly agricultural, with 80 percent of its population living in rural areas, recent rapid economic growth disproportionately favoring services and industry signals the advent of a demographic transition.

Ethiopia’s flourishing growth comes in no small part from public investment, which increased from a mere 5 percent of gross domestic product (GDP) in the early 1990s to 19 percent in 2011, strengthening everything from power production, roads, railways, and industrial parks

to education, health, and water provision.⁸ More recently, foreign direct investment (FDI) has played an influential role in national growth. In 2016, Ethiopia registered over \$3 billion USD in FDI, an increase of 46 percent from the previous year. China, India, Turkey, and the European Union (EU) were the primary sources of Ethiopia’s 2016 FDI.⁹

Ethiopia’s sustained economic growth over the past decade has dramatically decreased poverty rates, which fell from 30 percent to 24 percent between 2011 and 2016.¹⁰ Rapid expansion in the agricultural sector, which employs most of the population living below the poverty line, played a particularly critical role in reducing the poverty rate: each percent increase in agricultural output led to a decrease in poverty of nearly one percent.¹¹ If Ethiopia continues on its current growth trajectory, it will advance to middle income status by 2025.¹²

Though women make up more than 40 percent of the agricultural labor force and head approximately 25 percent of all farming households, they have less access to land and other factors of production than men.

While all smallholder farmers face constraints to productivity, female farmers encounter particularly acute challenges. Though women make up more than 40 percent of the agricultural labor force and head approximately 25 percent of all farming households, they have less access to land and other factors of production than men.¹⁵ What is more, women experience lower returns than men from a given level of resource expenditure.¹⁶ These lower returns point to broader social norms, market failures, and institutional constraints that prevent resources from translating into the same levels of agricultural productivity as they would for men.

Addressing these challenges is a necessary step to fulfill ambitious targets such as those that were set in the Growth and Transformation Plan II (GTP II), including achieving 8 percent growth in agriculture and allied sectors and increasing the percentage of rural women farmers who are benefiting from extension services to 30 percent. More research is needed to identify scalable solutions that can effectively address specific barriers faced by women farmers.

Part II provides an in-depth analysis of the factors linked to lower agricultural productivity among female farmers in Ethiopia.

Who Is a Farm Manager?

This report defines farm managers as individuals who have decision-making power over one or several land parcels, or a piece of land divided into fields. These decisions may include how or when to prepare land, sow crops, weed, harvest, process, produce, or sell a surplus.

This section uses the Ethiopia Socioeconomic Survey (ESS) third wave data (2015–2016), which represent 2,907 farm managers, of whom 21 percent are women. Relative to male farm managers, female farm managers in our data are, on average, five years older; are more likely to be illiterate; have smaller households; and are less likely to be married.

Illiteracy Rate

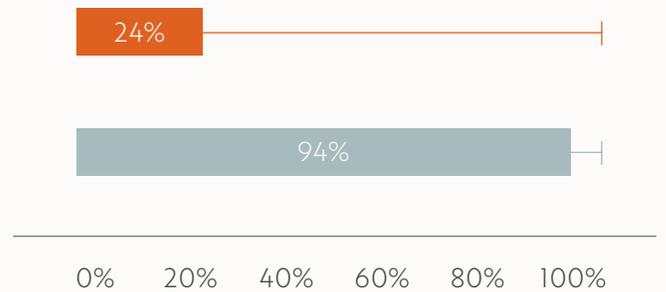


5 years older

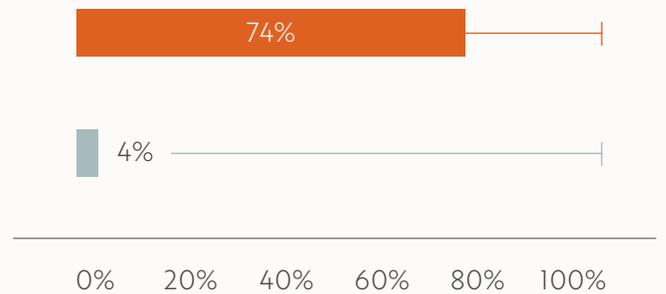
2 fewer household members

Female Male

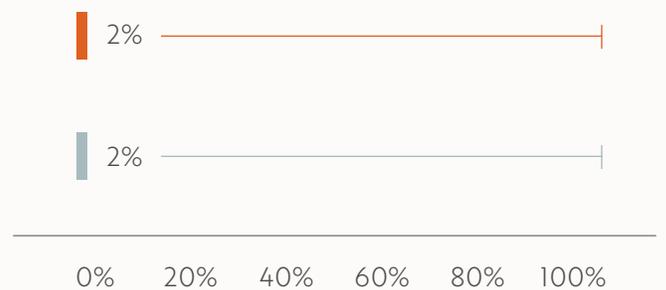
Married



Widowed, Separated, or Divorced



Single



BOX 5

How We Measure Agricultural Productivity

Agricultural productivity is defined in this report as the average value of agricultural output produced per unit of land managed (in hectares). The analysis uses the total value of agricultural output per unit of land, where the quantity of agricultural output is

measured by farm managers' estimates. Monetary values are based on local and regional sales price information to allow for comparability and land area is measured either by GPS devices or by farm managers' own estimates.

BOX 6

Examining Differences in Levels of and Returns to Resources

The Oaxaca-Blinder decomposition has been employed extensively in the existing literature to isolate the factors contributing to gender gaps in agricultural productivity and wages, among other outcomes.¹⁷ The decomposition delineates the gender gap into two main components: the endowment effect and the structural effect. The endowment effect captures the difference in levels of resources, such as education, fertilizer, or amount of credit that women have relative to men. Policies and programs may diminish the endowment effect by ensuring equal access to and use of resources for men and women. However, even when men and women have access to the same quantity and quality of resources,

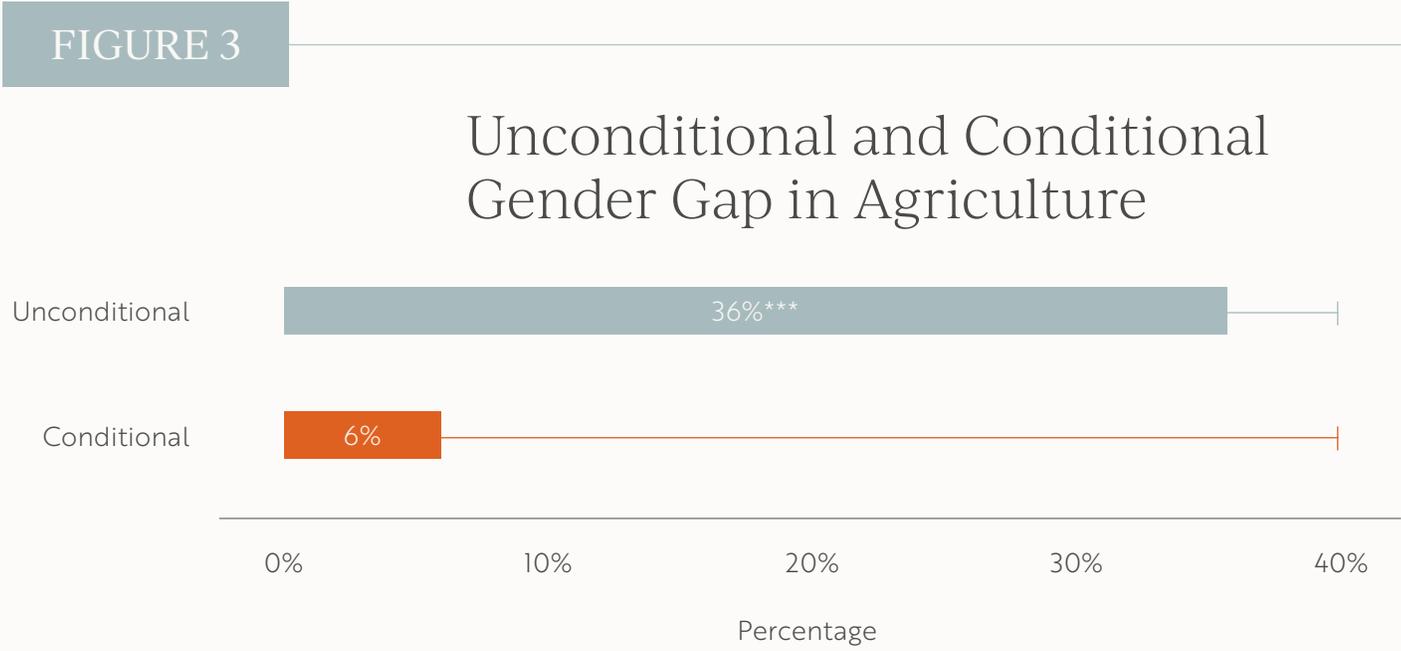
they may not achieve the same results. The structural effect thus refers to the portion of the gender gap that exists because of differences in the returns to resources. For example, the structural effect captures the difference in agricultural output per hectare for men versus women, given the same levels of education, equivalent use of fertilizer, or equal amounts of credit. Discrimination, social norms, and institutional constraints all perpetuate the structural effect. In this report, the endowment effect may be referred to as "levels," while the structural effect may be referred to as "returns." Appendix B provides additional technical details on the Oaxaca-Blinder decomposition.

Measuring the Gap

A simple average indicates that female farm managers in our data produce 36 percent less per hectare than their male counterparts.^{vi} This disparity, however, lessens to 6 percent when considering individual-, household-, and plot-level characteristics (figure 3).^{vii} The magnitude of the difference between the conditional and unconditional averages signals that, in large part, the agricultural gender gap may stem from unequal levels of productive factors.

Accounting for the Gap

Compared to male farm managers, female farm managers control smaller plots of land, cultivate fewer crops, use fewer inputs, and are less likely to access extension programs and formal credit. All of these factors are associated with women’s lower yields.^{viii} Table 2 displays the manager-, household-, and plot-level characteristics that, holding all else constant, contribute to the gender gap in productivity via levels and returns, respectively. Factors highlighted in orange widen the gender gap, while factors highlighted in blue narrow the gender gap. Factors that are not highlighted neither widen nor narrow the gap.^{ix}



Note: The symbols */**/** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

vi Part II draws upon ESS third wave labor and time use data (2015–2016) and follows a similar approach to that in Aguilar et al. (2014), which employs data from the 2011–2012 Ethiopian Rural Socioeconomic Survey to compute the gender gap in agriculture for Ethiopia.

vii The characteristics used to compute the conditional gender gap are 1) at the individual level: age, education, marital status, civil status, and religion; 2) at the household level: family labor, skills, household size, child dependency ratio, receipt of technical assistance, and household asset wealth index; and 3) at the plot level: ownership, log plot size, indicator variables for good soil quality, irrigation, remoteness of the plot, fertilizer and pesticide use, household land, hired labor, as well as percentages for cultivating cash crops, food crops, horticulture crops, and indicator variables for different agro-climatic conditions. See appendix A2 for descriptive statistics and details.

viii The term *extension programs* in this context refers to the advisory services provided by agricultural extension workers.

ix A much wider set of factors was tested in the decomposition but here we focus on only those found to significantly impact the gender gap. Appendix A2 provides additional information on the construction of the variables and descriptive statistics by gender for each of the factors that were taken into account during the gap analysis.

These findings highlight four key points:

1. Women receive fewer extension services than men

Agricultural extension services are the primary platform through which smallholder farm managers access information about new technologies and information. Female farm managers in our data, however, are less likely than their male counterparts to have attended an extension program, leading to a widening of the gender productivity gap.^x Figure 4 displays the gender gap in extension attendance, which has increased over time. This gap implies that women are, relative to men, increasingly less exposed to and aware of new techniques, farming knowledge, and management practices. Both supply- and demand-side factors may perpetuate the gap in extension program attendance.¹⁸ On the supply side, top-down agricultural extension models historically targeted farmers who were more likely to adopt technological innovations, frequently leaving out female farmers.^{xi,19}

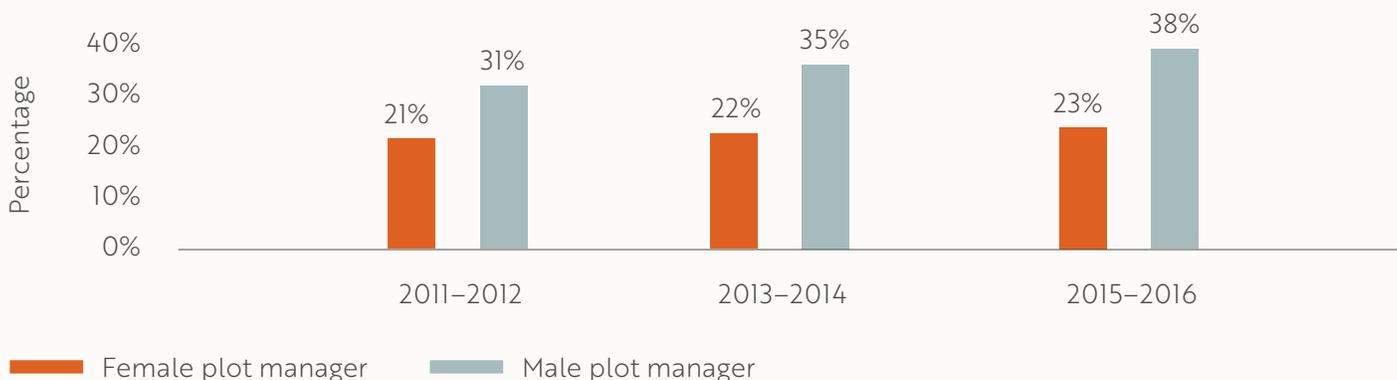
On the demand side, lack of access to agricultural education and complementary inputs often hinders women from properly understanding and advocating for their extension needs. In Ethiopia, policies have recognized and prioritized the importance of closing the gender gap in access to extension services. The challenge now lies in identifying and effectively addressing constraints that keep women farmers from benefiting from the existing extension system.^{xii}

2. Women access formal credit less than men

Credit and other financial services can provide small-scale farmers with the opportunity to improve farm productivity and transition from subsistence farming to large-scale and commercial farming.²⁰ In the short run, credit can help farmers increase their purchasing power to acquire necessary production inputs and finance their operating expenses, while in the long run it can help farmers to make profitable investments.²¹ Female farm managers in our data, however, are 9 percentage points

FIGURE 4

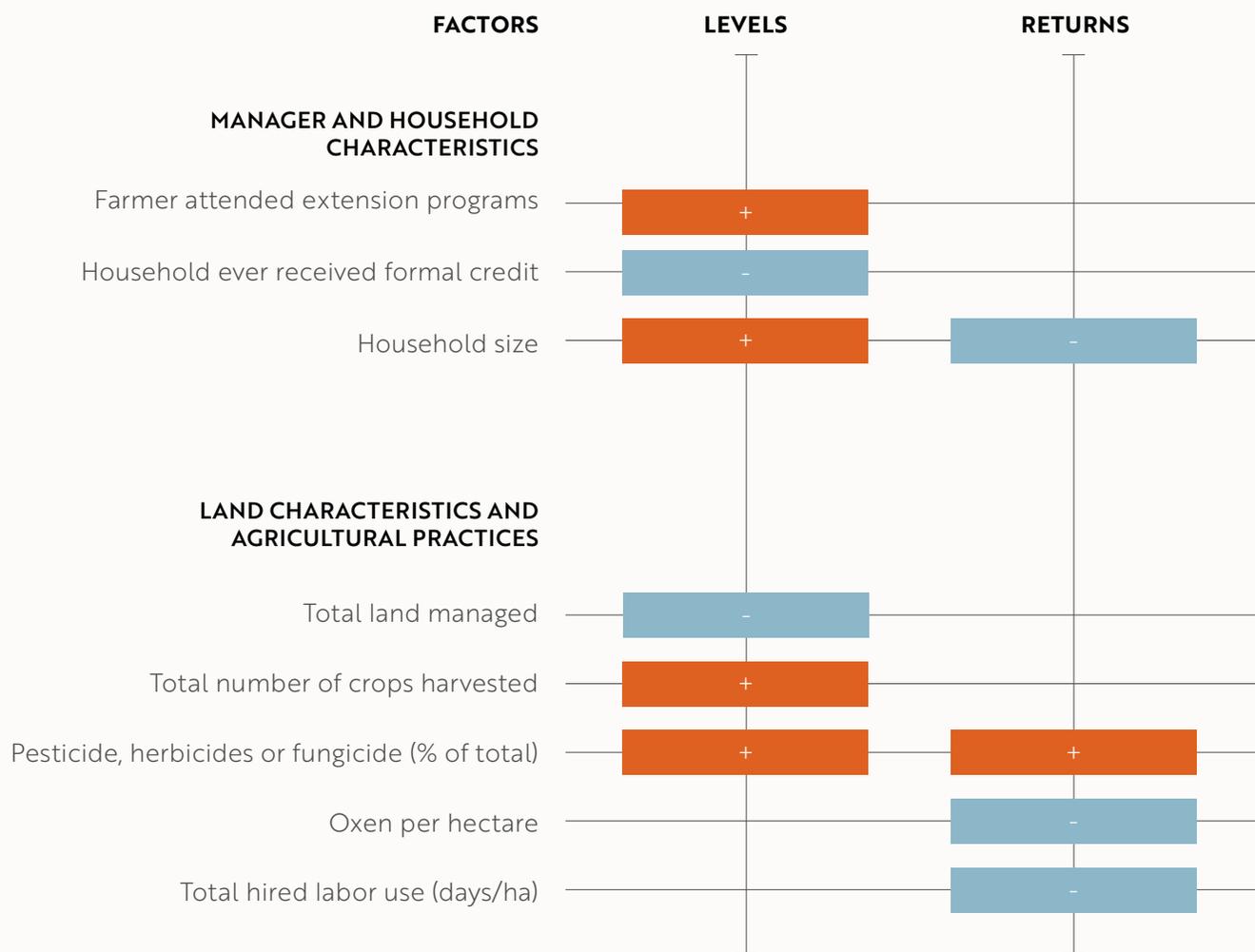
Attendance in Extension Programs



- x This result is related to the mean comparison described in appendix A2. This sample includes all those farmers who had a positive productivity in the last harvest season and for whom we have information on individual, household, and plot characteristics.
- xi Because adopting new technologies requires large initial investments of time that most women did not have due to domestic duties, women were a less attractive target group for extension programs.
- xii The Women Development and Change Package recognizes that female farmers have restricted access to extension services and highlights a set of agricultural extension services that women should benefit from. The services cover a broad range of options including input use, labor-saving technologies, participation in horticulture, nutrition-dense crop production, irrigation soil management, and agro-processing. Moreover, the Gender Equality Strategy for the Agriculture Sector proposes to address these limitations through capacity building of staff on gender-sensitive planning, programming, and service delivery.

TABLE 2

Factors That Explain the Gender Gap in Agricultural Productivity



Factors that widen the gender gap

Factors that narrow the gender gap

less likely to live in a household with access to credit than male farm managers.

One reason why women may have less access to formal credit is that they are less likely to own and control physical assets that serve as collateral. Furthermore, on average, women have lower levels of human and social capital which, in turn, can decrease their eligibility for formal credit. This puts women at a disadvantage: when credit is constrained, farmers are likely to use suboptimal levels of productive inputs, thereby limiting their productive capacity.²²

3. Women manage less land and harvest a narrower range of crops

Having more land and harvesting more diversified crops matter. Female farmer managers in our data, however, manage an average of only 0.6 hectares, compared to an average of 1 hectare for male farm managers. Improving women's access to land is a challenge that is highlighted in existing policy priorities in Ethiopia.^{xiii} Female farmers also grow a narrower range of crops than their male counterparts. While the size of land managed reduces the gender gap in productivity, with smaller plots tending to be more efficient, the less varied range of crops harvested widens the gender gap in productivity.

4. Women access fewer production inputs

Modern agricultural inputs such as fertilizers, pesticides, herbicides, and fungicides were developed to increase agricultural productivity and protect farmers against harvest fluctuations linked to pests, adverse weather, and soil degradation, and thus mitigate crop losses. Female farm managers in our data use lower levels of these agricultural inputs (by about 2 percentage points) than their male counterparts, which limits productivity and may imply greater vulnerabilities to shock-induced variations in production.

One reason why women, relative to men, may use less fertilizer and other chemical inputs is that they are typically sold in large quantities, requiring a sizable upfront cost that cash-constrained women may struggle to afford. Furthermore, women can be constrained in their mobility and limited in the transport options available to them. In remote rural areas, this affects access to fertilizer and, more generally, access to markets.²³ Women farmers may also require lower quantities of chemical inputs due to their smaller average plot sizes.

BUSINESS SALES

In Ethiopia, 38.6 percent of the GDP comes from the informal sector, which includes self-employment. This figure is consistent with the average of 38.4 percent for Sub-Saharan Africa and 38 percent for all low-income countries.²⁴ As in most countries in Sub-Saharan Africa, self-employment opportunities lie largely in small informal firms. The self-employed sector, on which this section focuses, is particularly important for women, who tend to have fewer opportunities in the wage sector.

In general, female business managers have less access to resources to grow and formalize their businesses, leading to smaller firms with lower profitability, compared to male business managers. While many women enter informal self-employment as a last resort with little intention to grow beyond a subsistence level, other women launch firms that have the potential to grow into larger enterprises integrated within the formal sector. In practice, it is often difficult to distinguish between "necessity" entrepreneurs, who may have little entrepreneurial motivation beyond meeting subsistence needs, and "opportunity" entrepreneurs, who see an opportunity and make a decisive choice to start a business with ambitions to thrive.²⁵ It is important to keep these realities in mind when reading the results on economic outcomes of self-employed women in this section.

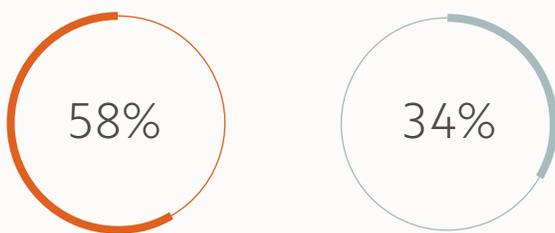
xiii The Gender Equality Strategy for the Agriculture Sector emphasizes the need to support the revision and implementation of land-related policies in Ethiopia to increase the profitability and productivity of women in the agriculture sector. Some strategies and programs have been developed to address these needs. For instance, the Women Development and Change strategy has listed a set of interventions related to ownership, access, and use of land. Among these are, encouraging sharecropping where women lack the required labor to cultivate their land, ensuring women obtain fair sharecropping agreements, assigning plots to landless women, and making women aware of their land ownership rights.

Who Is a Business Manager?

A business manager is an individual within a household in charge of the decisions regarding the earnings from an enterprise. This section uses the Ethiopia Socioeconomic Survey (ESS) third wave data (2015–2016), which represents 1,822 enterprises and 1,600 principal managers, of which 40 percent are women. Relative to male managers, female managers in our data are, on average, less educated; more likely to be household head; less likely to be married; and have smaller households. Male and female managers are, on average, the same age.

Some 57 percent of principal managers work by themselves and 43 percent have a co-manager. Finally, 34 percent of female managers and 14 percent of male managers work in manufacturing, while 31 percent of female managers and 38 percent of male managers work in trade (figure 5).

Illiteracy Rate

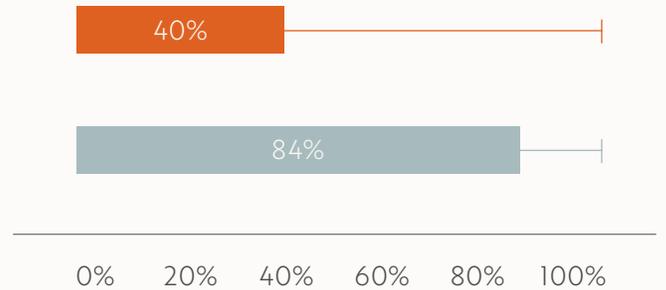


Same age

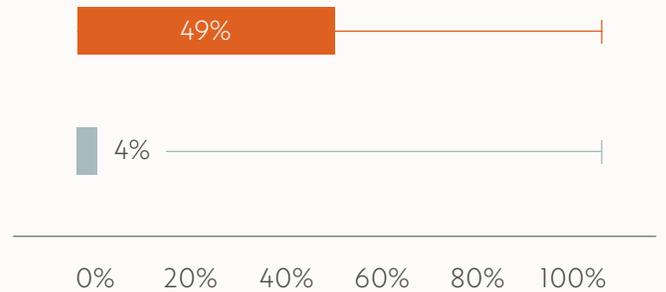
1 fewer household member

Female Male

Married



Widowed, Separated, or Divorced



Single

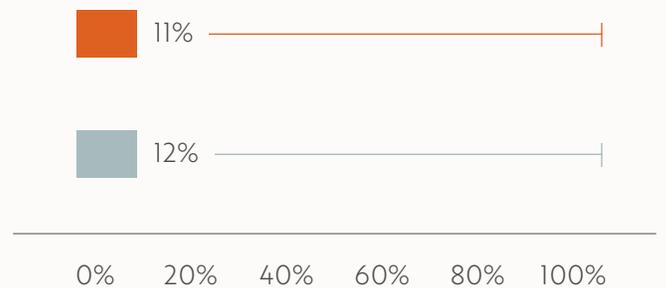
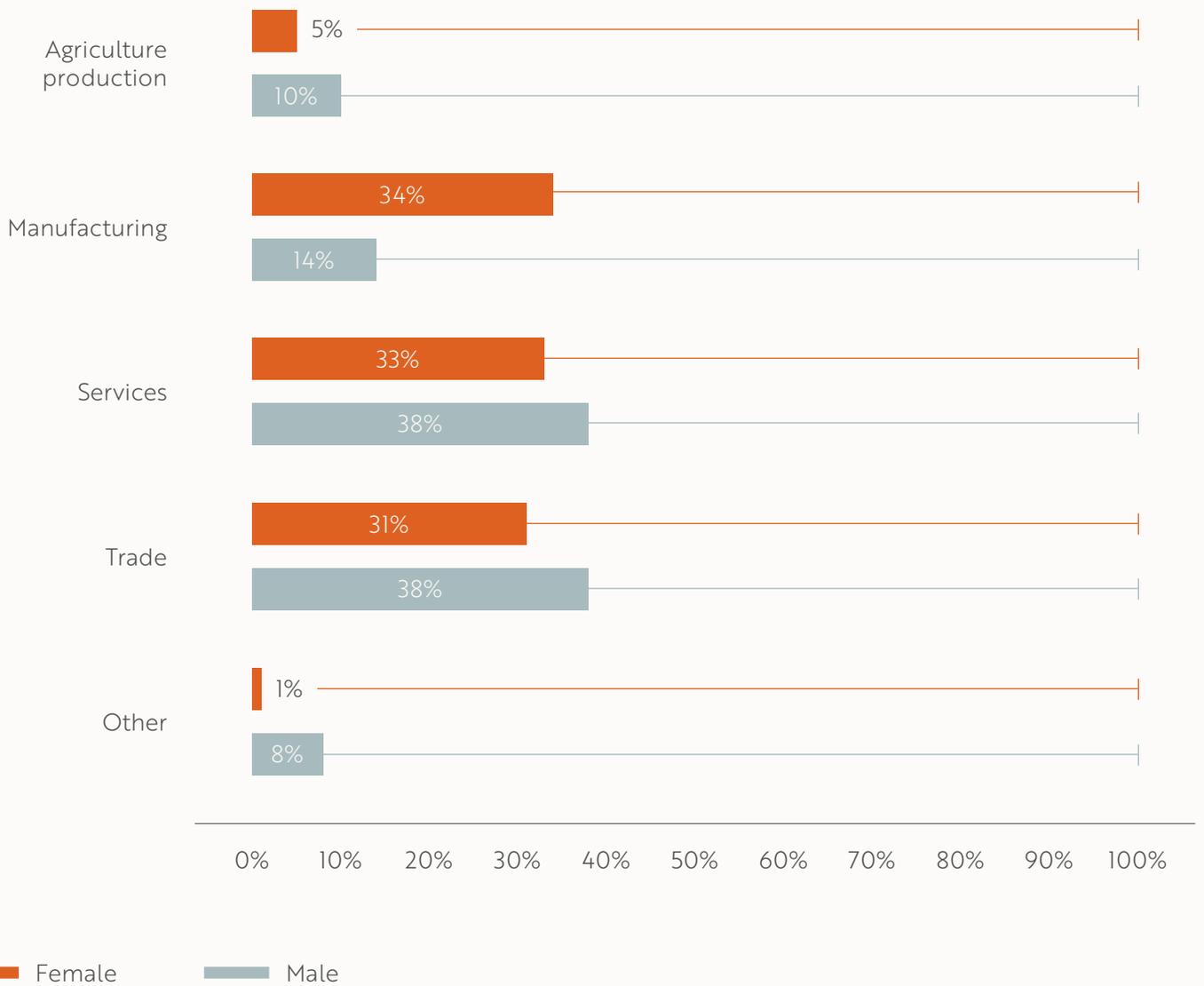


FIGURE 5

Women’s and Men’s Enterprises by Sector



Note: The calculations of shares by sector use data on enterprises at the manager level. For managers with multiple businesses in different sectors, more than one sector is recorded. As a result, the sums of the shares from each sector do not equal 100 percent.

Measuring the Gender Gap

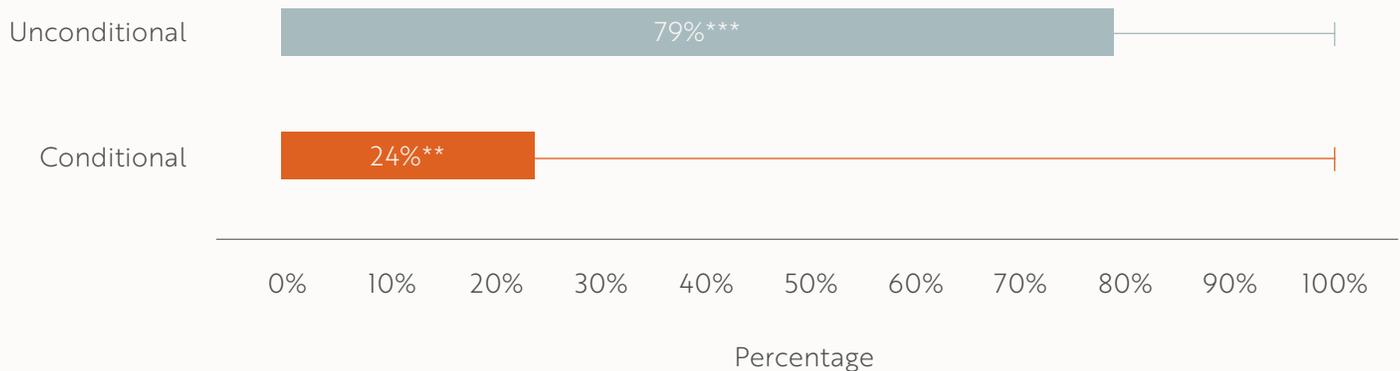
The simple difference in averages indicates that female business managers' sales are nearly 79 percent less than those of male managers.^{xiv} This disparity, however, lessens to 24 percent when considering individual-, household-, and enterprise-

level factors, including the costs of operating the business, indicating that the gender gap may stem largely from differences in levels of resources (figure 6).^{xv}

We use sales as a proxy for earnings given that business profits are not directly reported in the data.

FIGURE 6

Unconditional and Conditional Gender Gap in Entrepreneurship



Note: The symbols */**/** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

xiv This section draws upon ESS third wave labor and time use data (2015–2016). Because profits are not directly reported in the ESS, this analysis uses sales as a proxy for earnings, while controlling for costs incurred.

xv The characteristics used to compute the conditional gender gap are 1) at the individual level: age, education, civil status, and religion; 2) at the household level: household size, child dependency ratio, and wealth index; and 3) at enterprise level: years of operation, number of hired workers, number of managers in firm, formal credit, logarithm of total costs, source of capital, main client, industries, and geographical location. See appendix A3 for descriptive statistics and details. The decomposition results focus on only those variables found to significantly impact the gender gap.

Accounting for the Gap

Compared to male managers, female managers spend less time on business activities; hire less labor; are less likely to have a business license; and access less formal credit. All of these factors appear to be linked to women's lower business revenues. Table 3 displays the individual-, household-, and enterprise-level characteristics that, holding all else constant, contribute to the gender gap in business sales via levels and returns, respectively. Factors highlighted in orange widen the gender gap, while factors highlighted in blue narrow the gender gap. Factors that are not highlighted neither widen nor narrow the gap. These findings highlight four key points:

1. Women spend less time on business activities than men

The quantity of time that self-employed managers dedicate to their firms is closely correlated with business sales, especially in the context of small enterprises. In our data, each additional hour per week spent by a manager on his/her business is associated with a 1 percent increase in monthly sales. On average, self-employed women spend 17 hours per week on self-employment activities, compared to their male counterparts' 23 hours.

Examples of why self-employed women might work fewer hours relate to domestic responsibilities, enterprise type, and gender-specific risks in entrepreneurship. Since women often take on the majority of the domestic responsibilities, they necessarily have less available time for business-related activities. For this and a number of other reasons, female-managed enterprises are infrequently the main source of household income. As such, once a female-managed business achieves its desired level of

extra income, the manager may decide to shift her time toward domestic activities and chores. Alleviating time constraints stemming from domestic duties might be a promising policy option to allow women entrepreneurs to allocate more time towards their businesses.^{xvi} Finally, women's fewer working hours could simply reflect how work may become less safe after certain hours, and women decide not to work during those hours to avoid getting harassed or harmed.

2. Women hire less labor than men

Many businesses operate in labor-intensive sectors in which labor holds a high premium. Our data indicate that, relative to male managers, female managers hire 0.3 fewer employees, and each additional employee is associated with a 3.9 percent increase in monthly sales. Women may hire less labor due to a number of factors. For instance, women may have less entrepreneurial training or weaker business support networks and thus face more challenges in growing enterprises and managing a larger body of employees.²⁶

3. Women are less likely to have a business license

In our data, business licenses are positively correlated with entrepreneurial sales. This might be because licenses facilitate access to cheaper capital, larger markets, and additional business opportunities, for example, through government contracts. While the share of managers with licensed enterprises has increased over the years, the unconditional gender gap has not decreased (figure 7). Indeed, female-managed enterprises are less likely to have a business license than those managed by men. In our data, only 15 percent of female managers operate an enterprise with a business license, compared to 37 percent of male managers, and this difference widens the self-employment sales gap.

^{xvi} In order to alleviate women's time constraints, the Women's Development and Change Package proposes labor-saving household technologies to ease the burden of household chores and the establishment of child care facilities to reduce the time women have to spend on childcare.

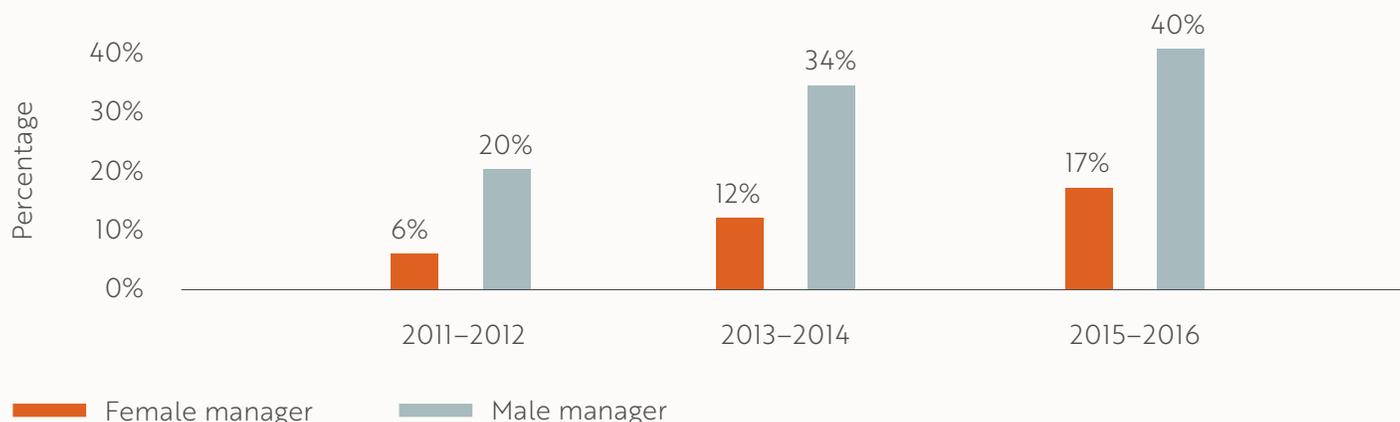
TABLE 3

Factors That Explain the Gender Gap in Self-Employment



FIGURE 7

Share of Women and Men Managers with a Registered Business



4. Women access formal credit less than men

Access to formal credit can ease capital constraints and thus spur firm growth, as well as protect businesses from economic shocks.²⁷ Male managers in our data are 3.7 percent more likely to take out loans than female managers. What is more, in terms of the size of the loans, male managers borrow about 50 percent more than female managers.

What really matters for entrepreneurs is not whether they borrow money, but rather how much money they borrow: while managers with credit in our data have lower sales than non-credit-borrowing managers, credit-borrowing managers' sales increase as their quantity borrowed increases.

In general, however, women face more barriers in accessing formal credit, often failing to meet minimum eligibility criteria such as collateral requirements. When they do access credit, they tend to receive smaller loans, which are often too small to meaningfully invest in their firms, thus widening the gender gap. A study from the World Bank's Women Entrepreneurship Development Project (WEDP) in Ethiopia suggests that offering larger loans to growth-oriented women entrepreneurs can

improve firm performance by promoting business growth and boosting employment levels.²⁸

WAGE EARNINGS

Until recently, wages in Ethiopia remained exceedingly low: in 2009, the average wage in Ethiopia was only one-third of the Sub-Saharan African average and less than one-half of the global average for low-income economies. In 2012, the monthly average real income was ETB 421.70 (USD 23.40): less than USD 1.25 per day.²⁹ Low levels of productivity and investment likely contributed to stunted wage growth.³⁰

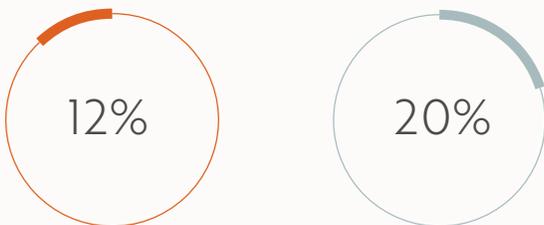
In our data, male employees are more likely to work in agricultural production and construction industries, while female employees are more likely to work in the manufacturing and education sectors (figure 8). While no significant gender differences exist in participation in the services and trade sectors, there are, however, significant gender differences in the wages that men and women receive for their work. Women are less likely to receive wages than men. When they do, female wages are, on average, less than male wages.

Who Is an Employee?

In our analysis, an employee is an individual who reported at least one paid job over the last 12 months. This section uses the Ethiopia Socioeconomic Survey (ESS) third wave data (2015–2016), which include 1,347 workers, of whom 37 percent are women.

Relative to male employees, female employees in our data are, on average, 4 years younger than male workers; less educated; living in smaller households; and less likely to be married. Male employees are more likely to work in agricultural production and construction industries, while female employees are more likely to work in manufacturing and education (figure 8).

University Degree

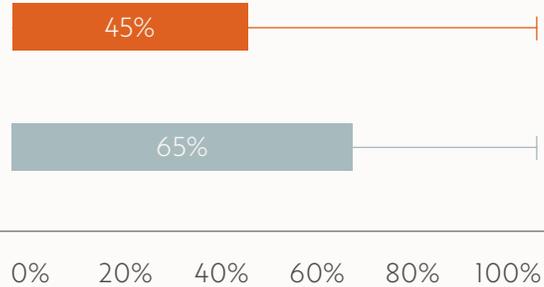


4 years younger

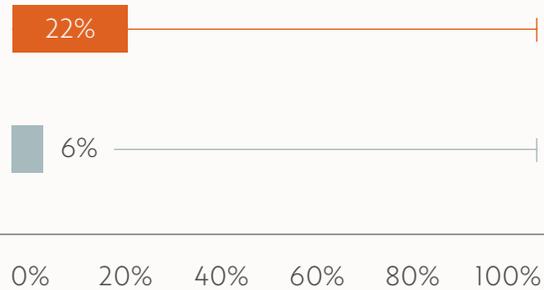
1 fewer household member

Female Male

Married



Widowed, Separated, or Divorced



Single

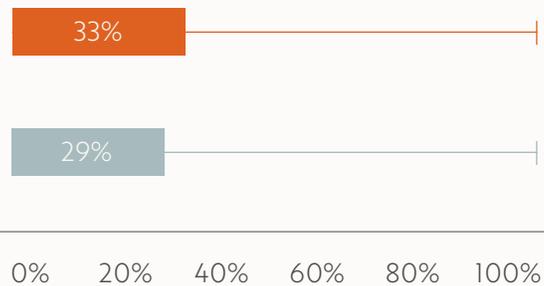
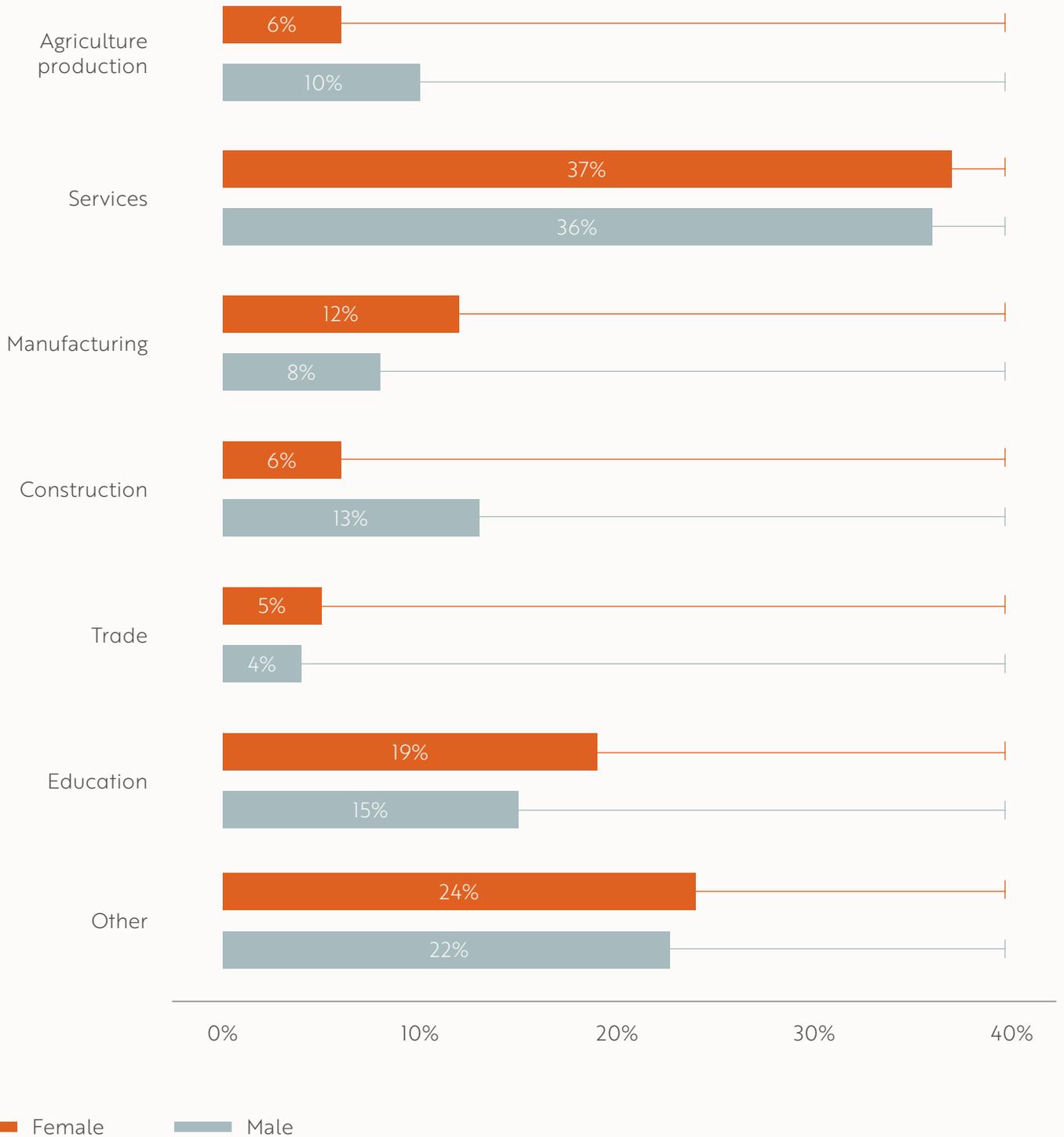


FIGURE 8

Women's and Men's Wage Employment by Sector



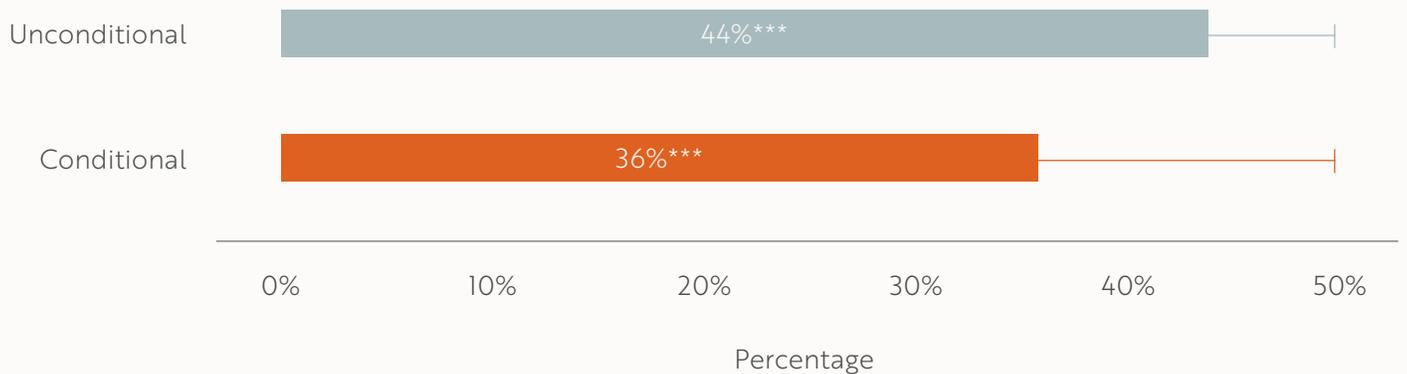
Measuring the Gender Gap

A simple difference in averages across both formal and informal sectors indicates that female employees in our data earn 44 percent less per hour than their male counterparts.^{xvii} This disparity drops to 36 percent when

considering individual-, household-, and job-level characteristics (figure 9).^{xviii} The marginal difference between the conditional and unconditional average suggests that, in large part, the gender wage gap stems from unobservable characteristics like aptitude, motivation, and formal versus informal sector work.

FIGURE 9

Unconditional and Conditional Gender Gap in Wages



Note: The symbols */**/** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

xvii This section draws upon ESS third wave labor and time use data (2015–2016).

xviii More precisely, the characteristics used to compute the conditional gender gap are: 1) at the individual level: whether employee is head of household, age, education, civil status, religion, and whether worker reported to be ill or injured; 2) at the household level: household size, child dependency ratio, and wealth index; and 3) at the job level: time spent on agricultural and non farm enterprise activities, type of employment, and industry of employment. See appendix A4 for descriptive statistics and details. The decomposition results focus on only those variables found to significantly impact the gender gap.

Gender differences in education partly explain the gender wage gap. Secondary and post-secondary education help individuals develop more advanced skills to garner higher wages: employees in our data who hold a bachelor's or graduate degree, have, on average, a 50 percent higher hourly wage relative to individuals who only completed secondary education, and a 20 percent higher wage than those who only completed their primary education.

Accounting for the Gap

Compared to male employees, female employees are younger; less likely to be married; more likely to hold a diploma or certificate as the highest degree; and less likely to hold a university degree. All of these factors seem to contribute to women's lower hourly wage. In contrast to the agriculture and self-employment gaps, however, few factors other than demographics explicitly explain the gender wage gap. As such, a large share of the gap stems from unobserved characteristics that were not included in the analysis—either because they are difficult to measure or because it is unknown which characteristics should be measured. Table 4 displays the individual-, household-, and job-level characteristics that, holding all else constant, relate to the gender wage gap via levels and returns, respectively. Factors highlighted in orange widen the gender gap, while factors highlighted in blue narrow the gender gap.

As before, factors that are not highlighted neither widen nor narrow the gap.^{xix} These findings highlight two key points:

1. Gender differences in education, age, and marital status explain part of the wage gap

Gender differences in education partly explain the gender wage gap. Secondary and post secondary education help individuals develop more advanced skills to garner higher wages: employees in our data who hold a bachelor's or graduate degree, have, on average, a 50 percent higher hourly wage relative to individuals who only completed secondary education, and a 20 percent higher wage than those who only completed their primary education. While more women have diplomas as their highest degree (22 percent of women compared to 12 percent of men), fewer women have university degrees as their highest degree (12 percent of women and 20 percent of men have at least a bachelor's degree).

xix A much wider set of factors was tested in the decomposition, but here we focus on only those factors found to significantly impact the gender gap. See appendix A4 for descriptive statistics and details.

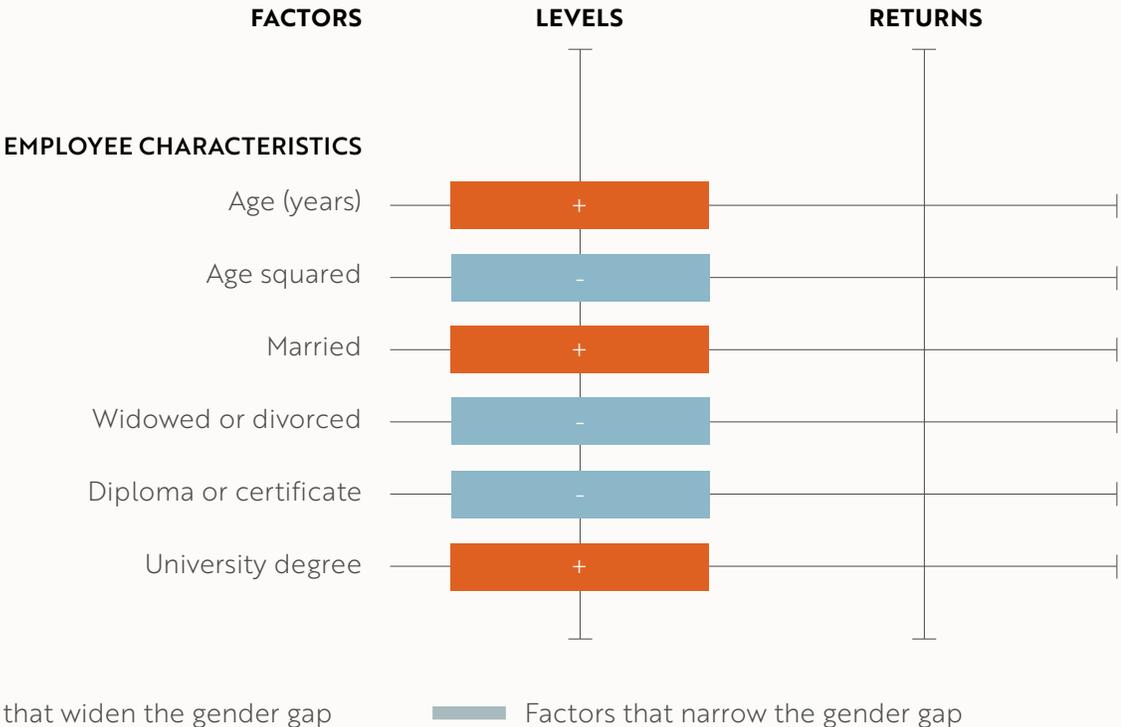
Age and marital status also explain part of the gender wage gap. Age is positively associated with wages. This trend contributes significantly to the gender wage gap as male employees in our data are, on average, five years older than female employees. Marriage is also positively associated with wages. This trend, too, contributes significantly to the gender wage gap. Some 65 percent of the male employees are married, compared to 45 percent of the female employees. Being widowed or divorced is positively associated with earnings. Given that only 6 percent of male employees are widowed or divorced, compared to 22 percent of female employees, this narrows the gender gap.

2. Role of unobservable factors in gender wage gap

Characteristics that are unobservable in the ESS data that is used in this analysis—such as motivation, or inter-personal communication skills—may explain some portion of the gender gap. These characteristics are unaccounted for in this analysis because they are difficult to measure and/or identify. A significant share of the gender wage gap may also possibly arise due to gender-based discrimination, whether intentional or subconscious, or because women in Ethiopia are more likely to work in the informal sector, where wages are usually lower than those in the formal sector.³¹

TABLE 4

Factors That Explain the Gender Gap in Wage Earnings



Part III

Contextual Factors

Influencing the
Gender Gaps

The gender gap analysis in this report presents clear evidence that the differences in access and returns to resources result in poorer economic outcomes for women in Ethiopia: lower agricultural productivity (36%), business sales (79%), and wage income (44%) compared to men. In agriculture, lower access to and usage of agricultural extension services, agricultural inputs, and formal credit, as well as lower crop diversity appear to drive the gender productivity gap. Meanwhile, in self-employment, differential business revenues between men and women stem from differences in time spent on business activities, access to hired labor and credit, and business licensing, whereas in wage employment, demographic factors and education help explain some (but not all) of the gender gap in income.

In addition to the key drivers identified in the report, there are other important factors that may affect the gender gaps in economic outcomes. Notably, gender gaps in agriculture, entrepreneurship, and wage employment do not exist independently of one another, but rather stem from and are linked through an underlying set of contextual factors and social norms. The sections in part III explore these links further, focusing on the role of labor market skills and social norms in influencing gender gaps in the Ethiopian workforce. In doing so, these sections highlight the particular mechanisms that hinder Ethiopian women from accessing or help them to identify relevant resources and opportunities.

LABOR MARKET SKILLS

Attempts to decompose gender differentials in labor market outcomes in Ethiopia suggest that between 20 and 39 percent of the gender wage gap for formal sector workers stems from differences in education, experience, and training.³² Women's limited labor market skills pigeonhole them into jobs concentrated in low-profitability sectors with more women working in informal wage employment than men.³³ Furthermore, 37 percent of women report seasonal employment and 13 percent report occasional employment.³⁴ These trends of sporadic employment likely lead to less on-the-job training, fewer professional development

opportunities, and a perpetuation of disparities in skill sets, job opportunities, and wages.

Narrowing the gender gap in labor market skills requires consideration of literacy, technical and vocational knowledge, informal learning channels, and entrepreneurial and noncognitive skills. This section seeks to explore these areas further.

Basic Literacy

Formal education equips young girls with literacy

Literacy is an important cornerstone of workforce skill sets: it facilitates technical and vocational skill development and predicts participation in a broader range of businesses, including those in more profitable, high-value-added sectors.³⁵ Some 42 percent of Ethiopian women are literate, relative to 69 percent of men.³⁶

Most individuals learn literacy skills through the formal education system, for which attendance has increased in the past two decades, especially for girls and women. Between 2000 and 2016, the share of women who had never attended school dropped from 77 percent to 49 percent. Similarly, the gender parity index, or the ratio of female to male primary school attendance, increased from 73 percent to 99 percent.³⁷ The effects of increased attendance on literacy are beginning to show for younger cohorts, with the current gender literacy gap for individuals ages 15–24 standing at only 3 percent.

While attendance rates and subsequent literacy rates for younger cohorts have improved dramatically over the past decade, low schooling quality and educational outcomes still present a critical challenge. A non-negligible percentage of students enrolled in primary school may still exit the education system without attaining basic skills, posing particular risks for young women, who drop out of school more rapidly than their male counterparts.³⁸ Indeed, the gender parity index in attendance drops with age, standing at 0.98 for the second cycle of primary school, 0.88 for secondary school, and 0.76 for preparatory school.³⁹

Ensuring gender sensitivity in schools boosts attendance and learning

Formal and non formal education may fail to offer girls and women a safe, accessible, and gender-sensitive environment. In some cases, they can face safety concerns in reaching education due to violence experienced on the way to, from, and at schools and learning centers. These security risks may fuel women's preferences to stay at home in order to avoid abuse and violence. Furthermore, education centers often do not meet girls, and women's sanitary needs due to a lack of latrines and clean water.

Initiatives from the World Bank, United Nations, and other multilateral organizations focus on reducing the distance to schools and learning centers, facilitating safe transportation, hiring more female instructors and instructors who are well-attuned to the needs of female students, and ushering boys and men into discussions on cultural and societal practices.⁴⁰

Adult and non formal education gives older cohorts the tools to build literacy skills

While younger cohorts' gender literacy gaps are decreasing, overall gender literacy gaps remain wide due to a persistent share of older illiterate cohorts. Adult and non formal education programs cater to this generation of women. In particular, they target illiterate individuals, individuals with some schooling, and dropouts of the formal education system with the goal of putting them on a path toward formal education, literacy, and skill training. Out-of-school children ages 7–14 may enroll in Alternative Basic Education, a three-year school equivalency program that covers material from the first four years of primary school.⁴¹ Children and adults ages 15 and up may enroll in Adult Literacy Training to learn literacy skills. Finally, any adult may enroll in community skills training centers (CSTCs) to learn basic literacy, numeracy, and other entrepreneurship and trade-related skills via regionally governed centers.⁴²

The gender gap in adult education starkly diverges from that in primary, secondary, and even tertiary school, since women are likely to experience more time and social constraints with age relative to men. Enrollment rates in adult education programs reflect this reality: while 70 percent of illiterate men are enrolled in adult education programs, only around 40 percent of illiterate women are enrolled in such programs.⁴³ In order to facilitate women's involvement in continuing education programs, it may be effective to offer financial incentives to offset time costs associated with attendance and transit.

Technical and Vocational Knowledge

Mid-level and urban workers can access formal technical education through TVET and ATVET

The gender gap in technical knowledge can lead women to self-sort into less technical positions. Accordingly, women have a much smaller presence in technical positions in the formal wage sector, accounting for roughly 30 percent of professional workers. Formal technical and vocational education and training (TVET) and agricultural technical and vocational education and training (ATVET) address these skill gaps, seeking to create mid-level workers for the formal wage and agricultural sectors. These programs cater to individuals who passed grade 10 and received sufficient scores on the national grade 10 exam.

TVET offers pre-employment training, additional training for employed workers, and remedial training for workers outside of the wage labor force. Individuals can participate in TVET at various stages in their formal education.^{xx} In rural areas, over 25 ATVET colleges provide agricultural skills training to both technical graduates entering the labor market as extension workers, and to smallholder farmers with limited formal education. Extension workers, or development agents, complete three years of training and are then assigned to farmer training centers in rural localities. There, they provide information to and conduct training sessions for farmers.

xx Students who do not pass the nationally administered exam in grade 10 and cannot continue to preparatory school may continue to government TVET colleges if they receive sufficient scores on the grade 10 exam. Students who do not receive sufficient scores on the nationally administered exam in grade 12 to attend university can enter TVET colleges. Students can also enter the TVET track at a higher level from university.

Female enrollment rates in TVET and ATVET are high, though room remains for more programmatic inclusivity

The constraints that limit women's participation in formal education seem to fade with respect to TVET and ATVET. Women's enrollment rates in these programs are nearly at parity with men's: of the 237,877 students enrolled in the Government of Ethiopia's TVET program in the 2012–2013 academic year, over 50 percent of students were female.⁴⁴ However, it is also important to continue encouraging female enrollment in technical and vocational training, for example, by facilitating easier and safer transportation to education centers, ensuring gender-sensitive spaces, or offering financial incentives for attendance.

To break down the barriers between female farmers and extension services, the Women Development and Change Package highlights a set of agricultural extension services from which women may benefit. The services cover a wide range of issues including input use, labor-saving technologies, participation in horticulture, nutrient-dense crop production, irrigation, soil management, and agro-processing. The strategy furthermore proposes to educate staff on gender-sensitive planning, programming, and service delivery in order to better serve female farmers. Finally, it suggests integrating relevant information, technology, and trainings into extension packages in order to respond effectively to women's needs.

Social networks can nudge women into more lucrative technical training

While women's enrollment rates in technical training programs are nearly at parity with men's, women tend to enroll in shorter-term technical training programs that provide skills for less lucrative, more traditionally female positions in commerce, textiles, and hospitality.⁴⁵ Meanwhile, men more often enroll in longer-term programs that provide training in science, technology, engineering, and math (STEM) fields or construction. Such fields have greater potential for higher incomes and executive functions.⁴⁶

Training programs for traditionally female jobs thus reinforce a "gender-stereotyped distribution of skills" in a landscape in which women make up only 20 percent of science and engineering professionals, 21 percent of business services agents, and 30 percent of information and communication technologies (ICT) technicians.⁴⁷

Social networks, however, can help to broaden women's training and employment decisions. Research by the World Bank Gender Innovation Lab indicates that women who take TVET courses in traditionally male-dominated fields like furniture making, manufacturing, or electricity do so largely due to their existing social networks in the given field and their consequent exposure to the field and its earning potential.⁴⁸ As such, occupational segregation results just as much from a woman's social capital and exposure as it does from gendered social norms on what is "men's work" or not. Facilitating social networks for women and increasing the presence of female role models and instructors in higher-level education can shift occupational gender norms, creating pathways for women into more lucrative industries and professions.

ICT-based methods jump the physical hurdles to education and facilitate learning

Education offered outside of brick-and-mortar settings can significantly impact women's economic outcomes. Programs that operate via print, radio, or television, for example, do not require physical attendance, thus unlocking opportunities for women to learn without constraints like transportation costs, distance, or threats of violence in transit. These methods will likely grow in conjunction with digital radio transmission in many parts of the developing world; they are highlighted as a particularly low-cost intervention in challenging educational environments.⁴⁹

ICT-based methods like mobile phone-based applications may also effectively facilitate knowledge, though not without shortcomings. Internet and mobile phone penetration remain low in Ethiopia at about 12 and 43 percent, respectively.⁵⁰ Furthermore, women, and rural women in particular, are not likely to have

In fostering social networks, it is important to actively consider and address the factors that often limit women’s capacity to access and leverage networks: mobility constraints, time poverty, and cultural norms that may restrict female and male interactions.

the same access to these technologies as men due to limited resources and social norms.⁵¹ While 46 percent of male-owned businesses used mobile phones for business purposes, only 3 percent of female-owned businesses did.⁵² As such, any attempts to engage the population with ICT-based mobile phone methods should operate within the framework of low broadband penetration and limited access to smart phones, particularly among women.

Social Networks

Low-level and rural workers acquire technical knowledge through social networks and experience

Informal learning channels like social networks and experience play an important and often underestimated role in disseminating technical, entrepreneurial, and noncognitive skills. In entrepreneurship, previous experience is equally important as, if not more important than, formal education in determining productivity levels.⁵³ In agriculture, experience and learning by doing have positive effects on technical efficiency, especially in traditional environments.⁵⁴

In addition to experience, social networks matter. In Ethiopia, where 74 percent of women and 62 percent of men lack access to print, television, or radio, social networks are an efficient way to spread information and technical knowledge in a relatively quick manner.⁵⁵ Research finds that neighbors are just as important

a source of information for agricultural input use as are formal public sources.⁵⁶ Thus, a well-established social network gives individuals a community through which they can share information and resources. In fostering social networks, it is important to actively consider and address the factors that often limit women’s capacity to access and leverage networks: mobility constraints, time poverty, and cultural norms that may restrict female and male interactions.

Formal female professional networks foster woman-to-woman knowledge transfer

Formally organized female professional networks facilitate social norm change, encourage relationships with and exposure to female role models, and foster woman-to-woman knowledge transfer. In doing so, these networks expose young women to new industries and occupations and build powerful formal social capital that women may otherwise lack. In urban areas, such networks may connect women who are engaged in formal wage labor and/or are female business owners. In rural areas, existing women’s cooperative organizations can provide a mode of technical knowledge transfer and learning that women may otherwise be unable to achieve independently. Importantly, these types of female organizations can operate under existing social norms that often restrict women’s interactions with men outside of their immediate family and thus affect women’s networking opportunities.

Social networks improve outcomes for entrepreneurs

Social networks play a particularly important role in entrepreneurial endeavors. For example, social networks often help entrepreneurs to identify business and labor market opportunities, as well as form reliable business relationships with potential clients, partners, and suppliers. Approximately 40–50 percent of firms surveyed in Ethiopia indicated that they had made contact with new suppliers through business acquaintances.⁵⁷ Entrepreneurs in both small and large firms most frequently find their business partners through business acquaintances.

Further, social networks provide entrepreneurs with knowledge of relevant macro-level trends and market conditions.⁵⁸ Of specific importance to women, social networks help entrepreneurs to secure more favorable input and output prices for goods. In a qualitative study in Southern Ethiopia, female farmers reported experiencing extortion and intimidation from male buyers when selling their crops at the market.⁵⁹ Such cases indicate that women may receive below market value for their output, pay above market value for their inputs, and have lower overall levels of allocative efficiency and productivity. Strengthening women's social networks may provide greater knowledge of and access to fair input and output prices for goods and, in turn, greater entrepreneurial success.

BOX 9

What is a Crossover?

Female enterprises in male-dominated sectors, or “crossovers,” often perform better than those in traditionally female-dominated sectors. When women cross over into male-dominated sectors in Uganda, their firms are almost three times more profitable than firms owned by women in traditionally female sectors and equally profitable as firms owned by men in male-dominated sectors.⁶⁰

Access to information and support from family members influence women's decisions to cross over. When women lack information about the earnings potential in male-dominated sectors, they are less likely to cross

over. When parents and husbands support women entrepreneurs, however, they are more likely to cross over into men's work.⁶¹ In general, crossover firms are more likely to report having started their business due to an opportunity provided to them by their husband. These findings lend support to build policies to help women entrepreneurs enter sectors that are male-dominated, and to involve men as a means to create opportunities for women. Developing strategies to nudge and support women entrepreneurs to move into more profitable sectors can help to reach goals such as those set out in the GTP II target of increasing the share of manufacturing industry in GDP to 8 percent.

Entrepreneurial, Noncognitive Skills

Entrepreneurial and noncognitive skills boost success

Entrepreneurial and noncognitive skills like dependability and persistence improve labor market outcomes, especially in low-skilled labor markets, where such skills are valued equally as much as, if not more than, cognitive skills.⁶² Meanwhile, skills like extroversion, a desire to accomplish, risk-taking behavior, and overestimation of one's capabilities are key psychological determinants of entrepreneurial activity at the individual level.⁶³ These characteristics are particularly important as potential areas for programming in the context of Sub-Saharan Africa, where roughly half of women in the non agricultural labor force are entrepreneurs.^{xxi,64}

The formulation of these skills starts at a young age. A number of studies of noncognitive skills in Sub-Saharan Africa reveal that girls have the same levels of confidence, motivational skills, and aspirations as boys. However, in one particular study, Ethiopian girls scored lower in self-efficacy and agency than their male counterparts at ages 12 and 15, with girls more frequently reporting that family members "make all the decisions about how [the girls] spend [their] time."⁶⁵ By increasing girls' and women's sense of agency over their own time, decisions, and lives, policies can further boost female aspirations and optimize labor market outcomes.

SOCIAL NORMS

Social norms are shared beliefs or informal rules about which behaviors are appropriate, typical, or desirable in a particular social group.⁶⁶ By providing a social group with a common understanding of goals and values, norms lead to behavioral patterns. While norms do not dictate behavior, they certainly influence the likelihood of particular behaviors by establishing expectations of rewards and approval or, conversely, sanctions and disapproval.

Gender norms, in particular, stem from and give root to the belief that men and women are and should be different in behavior, aspirations, status, and economic activity. Norms influence everything from educational investments early on in life, to factors later in life like the timing and dynamics of marriage, childbearing, and household tasks. This section explores the current state of four key domains in which gender norms influence women's economic outcomes: marriage and childbearing; intrahousehold dynamics; asset ownership; and internalized beliefs.

Link between norms and behaviors

Norms do not dictate behavior, but rather guide it in two primary ways:

1. People conform to social norms to achieve social recognition or to avoid social sanction.
2. Norms shape preferences by affecting individuals' self-conceptions and perceptions of the options available to them.

xxi Entrepreneurs here are defined as individuals who own their own businesses.

What are Gender Norms?

Gender norms are informal rules that define which behaviors are typical and desirable for men and women. They are informed by different types of common beliefs:⁶⁷

Gender role beliefs are ideas that associate some tasks and relational dynamics with men and others with women.

Gender category beliefs are beliefs about shared characteristics of men or women, as well as differences between men and women: “men are like X; women are like Y” or “men are good at X; women are good at Y.”

Gender status beliefs are hierarchical distinctions that attribute greater competence and authority to men.

Marriage and Childbearing

Delaying marriage promotes educational and economic advancement for women

Marriage in Ethiopia occurs early in life, with the median age at first marriage for women standing as one of the lowest on the continent: 17.1 years.⁶⁸ Among women aged 30–34, 27.3 percent had married by age 15.⁶⁹ Early marriages can result from both social norms and economic pressures. Norms that emphasize women’s role as mothers rather than providers may motivate girls to move into adulthood through marriage and motherhood rather than through education and employment. Other norms emphasizing virginity may encourage marriage in adolescence. Economic pressures often motivate marriages too, leading parents to arrange their daughters’ marriages in order to escape poverty at home. Women who marry early are more likely to drop out of school earlier and less likely to spend time acquiring valuable skills for economic success.

Delaying marriage may result in better educational and economic outcomes for women in Ethiopia. In attempts to improve women’s ability to earn, work, and thrive outside of the home, the 2000 Revised Family Code

changed the legal age of marriage to 18. By 2005, five regions and two charter cities had implemented the law. In these regions, the average age at first marriage increased by 0.26 years for women aged 15–19 years and by 0.13 years for women aged 20–24 years. The increased marriage age helped improve participation in the labor market, particularly for young women. In the five regions, labor force participation rose by 15–24 percent more than in regions that had not yet implemented the law.⁷⁰ Furthermore, the law significantly increased single women’s participation in paid work, year-round employment, work outside the household, and work in higher-than-average education occupations. The 2000 Revised Family Code represents a powerful signal from the government about women’s status in marriage. Such socially salient signals have the power to shift norms. The marriage age reform now applies across all regions and cities in Ethiopia, giving women greater incentives to pursue economic opportunities.

Increasing access to education shifts fertility preferences

In Ethiopia, 13 percent of adolescent girls aged 15–19 are mothers or are pregnant with their first child, while 38 percent of women give birth by age 18. Most women give birth within 2.1 years of marriage, placing the median

age for a mother's first birth at 19.2 years. Women who give birth in their teenage years are more likely to drop out of school, and throughout their childbearing years, women continue to grapple with decisions related to fertility, motherhood, and the labor market.⁷¹

Increasing access to education, however, shifts fertility preferences. In Ethiopia, universal primary education policies, implemented in the mid-1990s, essentially eliminated school fees for all grades in primary school. Subsequently, women's schooling increased and women's ideal family sizes decreased: a one-year increase in schooling was associated with a 0.34 drop in women's ideal family size.⁷² As such, norms surrounding women's education can influence women's economic activity in both direct and indirect ways. Education can improve skill development and lead to reductions in fertility expectations, in turn increasing the amount of time that women can contribute to the labor market.

While research indicates that increased education changes fertility preferences, evidence does not yet show that it delays first pregnancies. Between 2000 and 2011, the proportion of women with some primary education in Ethiopia rose from 34 to 67 percent, or about three percentage points each year.⁷³ However, this large rise in education did not result in a large shift in the mother's age at first birth, as it did in other Sub-Saharan African countries. Further research is needed to understand this trend. Perhaps, in Ethiopia, the age of first birth has not yet caught up with increases in education, or possibly, most women in Ethiopia still do not complete primary school despite receiving some primary education.

Affordable, accessible child care opens up workforce opportunities for women

Women may avoid jobs or self-employment opportunities that curtail the time they can devote to caring for family members and the household. Such choices impact their lifetime earnings and contribute to the gender gaps in wages and profits. In Ethiopia, a small, qualitative study of major companies like Ethiopian Airlines, Ethio Telecom, and NIB International

Bank found that female business leaders experience intense "work overload" attributed to their "inability to say no, the nature of their company and their work... and the imbalance of their responsibility and their required working hours."⁷⁴ Women experience an increasing trade-off between career and family as they enter roles with higher pay and responsibility, in part deterring women from aspiring to particular occupations or positions.

Affordable and accessible child care, especially in urban settings, could ease the constraints that women face when seeking employment outside of the home. In Kenya, subsidized early child care (ECC) for mothers living in a Nairobi slum led mothers to feel more eager to send their children to ECC centers. Women who received subsidized ECC were 17 percent more likely to be employed than those who did not receive it.⁷⁵ As more accessible child care could reduce gender inequalities in Africa, further research on this topic in Addis Ababa and other urban settings in Ethiopia would be of great value.

Intrahousehold Dynamics

Labor-saving household technologies and increasing the participation of men and boys in housework can ease the female burden of household chores

In Ethiopia, like in other parts of Sub-Saharan Africa, gender norms delegate to women and girls the majority of domestic work, including child rearing, cleaning, food preparation, wood and water collection, and food production. The Young Lives time-use survey indicates that Ethiopian women ages 18–19 spend 4.1 hours per day on domestic tasks compared to 1.5 hours for boys of the same age.⁷⁶ These domestic responsibilities impede women's opportunities to study, develop professional experience and skills, run a business, or engage in paid work. Sixteen percent of girls drop out of school to look after siblings and 12 percent of girls drop out of school due to family issues.⁷⁷ Time and care taking constraints increase with age for women. Older girls carry the greatest burden.

To address these constraints, the Women Development and Change Package proposes labor-saving household technologies to ease the burden of household chores and the establishment of child care facilities to reduce the time women have to spend on child care.

Interventions for gender-based violence could broaden women's opportunities to productively contribute to their communities

Violence against women impacts a woman's physical and mental health and affects her ability to engage in everyday activities and the workforce. Fear of violence can also curtail women's willingness to pursue certain economic activities, especially activities uncommon for women. According to 2016 Ethiopia Demographic and Health Survey data, one-third of ever-married women in Ethiopia had experienced spousal violence and 27 percent had experienced spousal violence within the past year. Sixty-three percent of women and 28 percent of men agreed that a husband is justified in beating his wife if she burns the food, goes out without telling him, neglects the children, or refuses to have sex with him. One in ten women reported having experienced sexual violence.⁷⁸

Divorce rights grant women more bargaining power

Divorce is common throughout Sub-Saharan Africa, contributing to union dissolution more than widowhood does.⁷⁹ In Ethiopia, the divorce rate among ever-married women is just above 30 percent, a relatively high percentage in comparison to other Sub-Saharan African countries.⁸⁰ Almost half of all marriages in Ethiopia end within 30 years and two-thirds of women who seek divorce do so within the first five years of marriage.⁸¹ When men seek divorce, they do so with arguments that the wife is unable to conceive. When women seek divorce they sometimes state that they have married too young or that they perceive their spouses to be unsupportive of employment agendas.⁸²

Divorce affects women's economic participation in a number of ways. On the one hand, a woman's ability to leave an unsupportive spouse or an unhealthy marriage can increase her bargaining power in

marriage.⁸³ Greater decision-making authority can positively influence women's control over productive assets and investments in economic activities. On the other hand, divorce can lead to higher numbers of female-headed households, which are typically disadvantaged in terms of asset ownership and labor supply. Policies to support women's economic activity will need to account for the disadvantages faced by women in female-headed households.

Asset Ownership

The 2000 Revised Family Code increases women's legal rights to assets

Assets such as land and business equipment serve not only as crucial inputs, but also as potential collateral for credit. Half of all women in Ethiopia own a house in part or in full, while forty percent of women own land. Of women who own land, half report having their name on a title or deed.⁸⁴ However, relative to men and male-headed households, women and female-headed households fare worse in land and asset ownership. Male-headed households own 2.2 hectares of land, on average, compared to 1.7 hectares for female-headed households.

The 2000 Revised Family Code addresses these inequalities by increasing women's legal rights to assets. While the previous Family Code granted permission to married women to control assets or pursue a profession, it failed to offer protection to unmarried or widowed women. The 2000 Revised Family Code better protects women by granting equal rights to spouses during the duration, conclusion, and dissolution of marriage, requiring equal asset division between the husband and wife upon divorce.

Bridging gender gaps in land registration improves women's tenure security

Compared to female-headed households, male-headed households have larger plot sizes, a larger proportion of cultivable land, and a larger fraction of registered land.⁸⁵ Women in male-headed households are very rarely primary land managers, though the reverse is not the case for men in female-headed households.

The Gender Equality Strategy for the Agriculture Sector urges policy makers to revise and implement land-related policies in Ethiopia to boost female farmers' profitability and productivity. The Women Development and Change strategy lays out a set of interventions to address gaps in ownership, access, and use of land. Key recommendations include encouraging sharecropping where women lack the required labor to cultivate their land, ensuring women obtain fair sharecropping agreements, assigning plots to landless women, and making women aware of their land ownership rights.

Furthermore, the 2003 Land Registration Act sought to grant equal inheritance and property rights to women. It facilitated land registration at a low cost, issuing one-page certificates with the household head's names (the husband for married households), neighbors' names, and details about the size, location, and land quality of farm plots. Some certificates included maps and photos of the husband and wife, making it more difficult for husbands to sell or rent out land without their wives' consent. To ensure transparency, land certificates were issued after public registration. Female heads of household (widows, divorced, and single women) also received certificates in their names for land in their possession. Furthermore, the Ethiopian land certification scheme required that land administration committees at the *kebele* level, or the smallest administrative unit in Ethiopia, include at least one female member.⁸⁶ The presence of female members in the land administration committees encouraged female-headed households to participate in land certification.

Overall, Ethiopia's land registration process increased tenure security for women.⁸⁷ A study across 15 villages in Ethiopia found that, combined with the Family Code revisions, the 2003 Land Registration Act shifted perceptions and social norms related to the division of assets upon divorce. While in 1997, only about 40 percent of women perceived that land would be divided equally between the husband and wife upon a no-fault divorce, this percentage increased to more than 80 percent by 2009. Similar patterns were

found for the allocation of the house and livestock. Moreover, women and men who were aware of the land registration were more likely to report there *should be* a more equitable division of livestock and land upon divorce.⁸⁸

Internalized Beliefs

Affirmative action can combat internalized beliefs and stereotypes

Women's and men's subjective assessments of their own capabilities contribute to gender gaps. In experimental games, when exposed to the concept of male superiority, men's self-perceived competence exceeds that of women. Gender gaps in self-assessed ability are especially prominent for tasks typically performed by only one gender or tasks for which either men or women have a perceived natural advantage. However, when gender was said to be irrelevant to the task, men and women showed no difference in self-perceived competence. Even in samples of established business owners, women maintain lower levels of self-assessed entrepreneurial capabilities compared to men.⁸⁹ Such gender differences in self-confidence or self-assessed skills can contribute to differences in entrepreneurial investments and outcomes.

Stereotypes and gender bias also contribute to gender participation gaps. A study of U.S. major metropolitan symphony orchestras finds that concealing the identities of the performers auditioning significantly boosted women's chances of succeeding in selection.⁹⁰ Other recent research of tech companies in the United States shows that hiring practices are gendered: recruiters use "geek culture references" and overt gender stereotypes, resulting in women having a difficult time making it through recruitment.⁹¹ Bearing these challenges in mind, the Women Development and Change Strategy and the National Employment Policy and Strategy promote affirmative action to ensure a certain proportion of women participate in programs and projects.⁹²

Part IV

Gender and Innovation in Programming

Despite Ethiopia's remarkable economic progress over the past decade, current gender gaps in agricultural productivity, entrepreneurship, and wages reveal that challenges remain to realizing the full potential of women's economic empowerment. Evidence from this report suggests that an array of contextual factors and social norms holds women back, including time poverty, limited labor market skills and technical knowledge, and a lack of gender-sensitive spaces, social networks, and mentors. These challenges manifest themselves in a wide range of factors identified in the decomposition analysis, such as more limited access to agricultural extension services, less intensive use of agricultural inputs, higher costs for their businesses, and fewer hours spent running their businesses, among others.

To accelerate the country's progress in achieving inclusive growth and equality for women, government leaders and their development partners should consider the following policy responses—informed by the report's comprehensive analysis on the drivers and the underlying causes of the gender gaps—as priority areas where the potential to close gender gaps in economic empowerment is greatest.

POLICY PRIORITIES

- **Expanding access to customized agricultural extension services for female farmers.** Agricultural extension services could play a considerable role in closing the gender gap in agricultural productivity if they target women on a larger scale. They could also tailor their interventions to focus on the factors widening the gender gap in productivity, such as use of agricultural inputs.
- **Increasing women's access to key inputs in agriculture and entrepreneurship.** For female farmers, boosting women's access to fertilizer and pesticides, and for female entrepreneurs, increasing access to hired labor and a business license, could help reduce the gender gaps in productivity and earnings.
- **Improving women's access to credit, and especially to mid-sized lending products, when they often lack access to enough collateral to be considered "creditworthy".** Two key approaches could work in making women more creditworthy: the first is building women's assets (e.g. land, through co-titling in land registration), and the second is developing innovative lending products that use nontraditional, non-asset-based forms of collateral. These types of interventions could enable women to access credit at levels that would enhance their productivity and earnings in agriculture and self-employment.
- **Promoting educational opportunities, as well as job skills development through vocational and technical training.** Giving women and girls the opportunities to advance their education, develop their skills, and possibly cross over into more lucrative male-dominated sectors could help narrow the gender gap in employment and earnings.
- **Tackling gender norms and institutional constraints that limit women's economic empowerment.** Entrenched gender norms and institutional barriers underlie many of the key drivers of the gender gaps identified in the report. Recent legal changes, however, have already shown promise in beginning to shift norms in marriage, childbearing, and asset ownership.
- **Alleviating time constraints for women by providing services and interventions to reduce the time burden posed by household duties.** Such interventions could make more time available for women to dedicate to other productive activities and contribute to closing the gender gap in employment and earnings.

GENDER INNOVATION

To address the sizable gender gaps in economic outcomes and achieve Ethiopia's inclusive growth targets will require a fundamental rethinking of policies and programming aiming to reduce gender inequality. The intersection of gender and innovation in programming can play a significant role in addressing the factors that limit women economically.

Incorporating gendered perspectives into all aspects of a policy or a development project—from initial design and planning to monitoring, evaluation, and learning—can help meet multiple objectives and boost overall development outcomes, including those related to women's economic empowerment, education, gender-based violence, and aggregate economic growth.⁹³ Innovation, which includes but is not limited to technological advances, can lead to progress in achieving multiple development goals at once by driving economic growth and addressing social challenges. Innovation may consist of, for example, using virtual peer-support networks to

spread knowledge among women in rural areas, drawing on insights from behavioral science to reduce gender-based violence, or developing new partnership models such as a social impact bond tied to employment outcomes of young men and women.⁹⁴

The section that follows presents a collection of previously implemented innovations that can provide examples of potential programming options in Ethiopia. Virtually all of the innovations have the potential to be adapted to the Ethiopian context, with Ethiopian policy makers best-positioned to determine the appropriateness of a given intervention. While some stories are illustrative or exemplary, others have the real potential for replication and scalability from local to regional and national targets. Moving forward, further evidence on impacts, feasibility, and costs could help support policy makers who are considering adapting these solutions to specific contexts or taking them to scale. This report sets the stage for further design, experimentation, and evaluation of innovative solutions in gender programming to increase their effectiveness and maximize impact on women's empowerment.

Gender Innovation Menu

The innovations presented below are sourced principally from partners of the International Development Innovation Alliance's Gender and Innovation Working Group (IDIA/GIWG), which is composed of senior gender and innovation representatives from the world's major donor and development institutions, including Australian Aid, the Bill and Melinda Gates Foundation, Global Affairs Canada, Global Innovation Fund, Grand Challenges Canada, Results for Development, Swedish International Development Cooperation Agency (Sida), The Rockefeller Foundation,

#	Case study	Description
Agricultural knowledge and use of inputs		
1	Farm.Ink	Farm.Ink has developed an automated chat-bot application, which helps connect farmers looking for advice and input, and selling agricultural products. The chat-bot links farmers to various social media platforms where they can connect with peers, solicit advice, and receive tips related to agricultural timing and crop growth. It also helps farmers make connections to potential buyers in East Africa. Implementing partners are using some of the latest technology and user-centered design methods to engage and connect with farmers who already have access to smartphones and mobile financial services.
2	Reel Gardening	The entrepreneurial founder of Reel Gardening, Claire Reid, developed a method of properly spacing seeds by placing them in strips of newspaper fused with the right combination of flour and fertilizer. The proper spacing and depth of the seed within the paper envelope also varied depending on the type of seed being utilized. The biodegradable innovation is now available online and will soon be implemented in communities in South Africa.
3	Precision Agriculture for Development	Precision Agriculture for Development (PAD) utilizes precision agriculture technologies from developed countries including mobile soil analysis, satellite and drone photographs, and weather prediction models to disseminate personalized agricultural advice via mobile phone and other ICT-based extensions. In Ethiopia, PAD partners with the Agricultural Transformation Agency on the existing voice-based mobile advisory services.
4	Orange-Fleshed Sweet Potato	The research and development of the orange-fleshed sweet potato (OFSP) and related research and application of effective cultivation techniques have together been heralded by many as one of the most successful examples of micronutrient and vitamin bio-fortification efforts in agriculture and development.
5	BioEnsure	The technical innovation 'BioEnsure' are seeds resistant to extreme climates. The program teaches women in small, rural farming villages how to apply the seed treatment protocol and start their own businesses as agricultural distributors of the product. The product is resilient to drought and heat- waves. The program sells the product directly to these women who treat the seeds and sell them within their respective communities.

Department for International Development (DFID), UNICEF (United Nations International Children’s Emergency Fund), United Nations Development Programme (UNDP), United States Agency for International Development (USAID), and World Bank Group. The IDIA/GIWG works at the nexus of gender and innovation in an attempt to accelerate efforts toward meeting the United Nations’ Sustainable Development Goals (SDGs). The advantage of drawing innovation case studies from these partners lies in the fact that they represent both breadth and depth, across diverse institutional settings and varied geographies.

Gender component/constraints addressed	Countries of operation	Implementing partner
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Agricultural knowledge + Access to extension + Limited professional networks and role models (application has capacity to create a stronger network among female farmers) <p>Limitations</p> <ul style="list-style-type: none"> • Must recognize gendered division of labor in agriculture • Gender divide in access to ICTs may limit women’s access to these resources • Limited mobile penetration in Ethiopia 	Kenya	Farm.Ink
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Agricultural knowledge + Limited job opportunities (manufacturing these strips creates jobs for previously unemployed men and women) 	South Africa	Reel Gardening
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Agricultural knowledge + Access to extension <p>Limitations</p> <ul style="list-style-type: none"> • Must recognize gendered division of labor in agriculture • Gender divide in access to ICTs may limit women’s access to these resources • Given the limited mobile penetration, PAD works exclusively through voice-based mobile advisory in Ethiopia. Note: In other countries it operates using SMS and internet. 	Ethiopia, India, Pakistan, Kenya, Rwanda, Ecuador, Bangladesh	Precision Agriculture for Development
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Nutritional (vitamin A) deficiency that disproportionately impacts women and children 	N/A	CGIAR (International Potato Center)
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Impact of drought on crops + Limited job opportunities <p>Limitations</p> <ul style="list-style-type: none"> • Not in operation outside of the United States • Price point is unclear 	United States	BioEnsure

#	Case study	Description
Financial products		
6	Caregiver	Caregiver is a financial innovation in the sense that it is a new design and delivery model of an existing category of financial products (insurance). Caregiver is cash based and covers "hidden" costs of illness. It is also a social innovation in the sense that it has effects beyond the insured individual, which extends to the broader family.
7	M-PESA	M-PESA is a mobile phone-based money transfer, financing, and micro-financing service that saves beneficiaries time (waiting at banks), money (interest rates associated with cash transfers), and improves security (reducing cash-related crime). The innovation has scaled at an incredible pace and is now estimated to serve approximately 200,000 households. An estimated 25% of the country's gross national product (GNP) flows through M-PESA.
Entrepreneurial employment		
8	Targeting the Hardcore- Poor	Bandhan-Konnagar Targeting the Hardcore- Poor (THP) program utilizes an innovative, 24-month graduation model to support extremely poor women on the pathway out of poverty through entrepreneurship. Research showed that Bandhan-Konnagar's innovative approach promoted positive gains in income, livelihoods, and health, which persisted even one year after the program concluded. There was a four-fold return in income spent on ultra-poor households, and participants ended the training program with an approximate one-quarter increase in their personal purchasing power.
9	Interactive Voice Response (IVR) Employment Program	Babajob created an Interactive Voice Response (IVR) application and platform that permits lower-literate or illiterate job-seekers to access and utilize the service, using a basic mobile phone. Clients can use the platform to create profiles (called 'digital resumes'), search listings for better-quality jobs (higher pay, closer to home), apply to positions of interest to them, and have access to updates about relevant job opportunities.
10	Living Goods	Living Goods employs and trains local people as community health promoters (CHPs) to sell goods and life-saving medical supplies door-to-door at affordable prices. Living Goods equips mostly saleswomen with entrepreneurial skills, while simultaneously improving health outcomes in their communities.
11	U-Report	The U-Report tool is UNICEF's free digital youth engagement tool. It is used by approximately five million people around the world and implemented in over thirty-five different countries. The U-Report platform gives youth a place to voice opinions, pose and answer questions, and address youth concerns through online and SMS-based mobile features that include games, polls, surveys, and anonymous peer counseling services.

Gender component/constraints addressed	Countries of operation	Implementing partner
<p>Constraints addressed + Shocks to household income</p> <p>Limitations</p> <ul style="list-style-type: none"> • Gender divide in access to ICTs may limit women’s access to these resources • Limited mobile penetration in Ethiopia 	Jordan	Women’s World Banking
<p>Constraints addressed + Household consumption and savings patterns + Costs associated with financial transactions + Time poverty from time spent in travel to physical financial institution</p> <p>Limitations</p> <ul style="list-style-type: none"> • Gender divide in access to ICTs may limit women’s access to these resources • Limited mobile penetration in Ethiopia 	Kenya, Tanzania, Afghanistan, South Africa, India, Romania, Albania	Safaricom
<p>Constraints addressed + Identifying extremely poor women (program uses an innovative Participatory Rural Appraisal approach to identify and cater their programs to the most marginalized women)</p> <p>Limitations</p> <ul style="list-style-type: none"> • Successful in the Indian context but may have different results in Sub-Saharan Africa 	India	Bandhan-Konnagar
<p>Constraints addressed + Limited job opportunities</p> <p>Limitations</p> <ul style="list-style-type: none"> • Program has not yet been explicitly adapted to women but potential exists • Participants need access to a mobile phone; limited mobile phone penetration in Ethiopia 	India	Babajob
<p>Constraints addressed + Limited job opportunities + Healthcare</p>	Uganda, Kenya, Myanmar, Zambia	Living Goods
<p>Constraints addressed + Gender divide in ICTs (gender equality is at the heart of program’s mandate and to increase the involvement of more girl ‘U-Reporters’, the program has created and promoted multimedia content and key events that speak directly to the concerns and needs of adolescent girls)</p> <p>Limitations</p> <ul style="list-style-type: none"> • Gender divide in access to ICTs may limit women’s access to these resources • Limited mobile penetration in Ethiopia 	N/A	UNICEF

#	Case study	Description
Networking and mentorship		
12	Let Girls Map	Let Girls Map is one campaign of YouthMappers, a broader effort to involve and link youth locally, regionally, and globally, to empower them around identifying and prioritizing solutions to their development challenges. Let Girls Map connects and empowers girls around identifying educational resources that directly serve girls and women.
13	Rural Women Striding Forward	Rural Women Striding Forward is a 2.5-year initiative that funded 22 rural women's groups in Burkina Faso, Kenya, and Uganda, working on sustainable agriculture and the promotion of women's rights. These grassroots grantees trained women in agricultural techniques, promoted participation of thousands of women and men in women's rights activities, and increased women's access to networking opportunities.
14	Meri Mentorship & Leadership Program	Meri Mentorship & Leadership Program is an initiative that is currently being designed and implemented to match recent female university graduates from Addis Ababa University with older, more experienced women to create a network of mentees and mentors. It aims to provide young women with networks, information, and career guidance.
Gender-sensitive spaces and adolescent girls		
15	Biruh Tesfa	Biruh Tesfa is a program that aims to reach out-of-school adolescent girls with female mentors and non formal education and life skills training. Adult female mentors go house to house to contact eligible girls. It is managed by the Population Council alongside the Ethiopia Ministry of Women, Children, and Youth Affairs.
16	ZanaAfrica Group	ZanaAfrica delivers reproductive health education and sanitary pads through local organizations in order to increase school attendance and confidence among adolescent girls.
17	Ekolakay, Enviro Loo, Sanivation, Afrisol Energy	These innovations provide clientele with household lavatories, which permits a private space to utilize the toilet. All wastes are safely treated and transformed into nutrient- rich compost that can be safely applied to support agriculture, agroforestry, and reforestation efforts. The lack of access and proximity to toilets or latrines means that women and girls must travel considerable distances to reach suitable sanitation facilities. This reality places women and girls in dangerous situations—the correlation between gender-based violence (GBV) and lack of access to safe sanitation services is well- documented worldwide.

Gender component/constraints addressed	Countries of operation	Implementing partner
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Agricultural knowledge (this enables the mapping of water and natural resources and classification of land types for agricultural purposes) + Limited professional networks and role models (creates network among girls and young women) <p>Limitations</p> <ul style="list-style-type: none"> · Requires access to ICTs and internet, which is limited in Ethiopia 	Global	Youth Mappers
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Agricultural knowledge + Use of inputs (finances women to purchase inputs if they cannot afford them) + Limited professional networks and role models (creates information sharing and networking among female farmers) + Land rights and certification (grantees inform women about their rights and encourage activism) 	Burkina Faso, Kenya, Uganda	Global Fund for Women
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Limited professional networks and role models + Lack of exposure or information on career paths <p>Limitations</p> <ul style="list-style-type: none"> · Program is in its early stages and commenced in October 2018 with planned uptake of 30 girls per quarter 	Ethiopia	Earuyan Solutions
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Relatively low participation in formal school, non formal education, and literacy programs among adolescent girls + Vulnerable girls (disabled, child domestic workers, child sex workers) often confined to the home 	Ethiopia	Population Council, Ethiopian government
<p>Constraints addressed</p> <ul style="list-style-type: none"> + School drop-out rate among adolescent girls 	Kenya, United States	ZanaAfrica Foundation
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Need for gender-sensitive spaces that include private toilets + School drop-out rate among adolescent girls + Gender-based violence + Limited job opportunities (program manages waste production through weekly waste collection service that employs female managers) + Time poverty from collecting fuel and water 	Haiti (EkoLakay), Kenya (Sanivation, Afrisol Energy), South Africa (Enviro Loo)	Sustainable Organic Integrated Livelihoods (SOIL)

#	Case study	Description
Time poverty and travel outside the home		
18	Solar Sister	The Solar Sister project addresses energy poverty by working to empower women with new economic opportunities. The organization funnels innovative, clean energy technologies through a woman-centered direct sales network to bring both light and economic opportunities to remote communities in rural Africa.
19	Green Heat	Green Heat is a technological innovation—an anaerobic digester that transforms biodegradable biomass (waste, leaves, manure) into a clean burning fuel. The Green Heat innovation reduces reliance on traditional wood-fuel stoves.
20	eWaterpay	The eWaterPay innovation system helps customers lower their water management costs by up to 50% and use savings to increase water access points in both rural and urban settings.
21	Eco-Fuel Africa	The Eco-Fuel Africa program encourages and instructs rural farmers, unemployed women, and young people to transform locally-sourced farm and municipal and agricultural wastes into clean-cooking fuel briquettes.
22	XPRIZE for Water Abundance Winner: Skysource/Skywater Alliance	The Skysource/Skywater Alliance was the winning entry to the XPRIZE Water Prize, an innovation challenge to apply science and technology to find a way to extract water from the air. Skysource/Skywater Alliance won the competition for producing at least 2,000 liters of water per day from the atmosphere at a cost of no more than 2 cents per liter with only renewable energy.
23	M-KOPA	M-KOPA installs home solar systems, using a socially innovative approach: a ‘pay as you go’ mobile phone payment system for energy. It has helped provide approximately one million people in Kenya, Uganda, and Tanzania access to green, safe, and affordable energy options for lighting and mobile phone charging in their own homes.

Gender component/constraints addressed	Countries of operation	Implementing partner
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Time poverty from collecting fuel and water + Limited job opportunities (organization creates sales opportunities for women) 	Nigeria, Tanzania, Uganda	SolarSister
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Time poverty from collecting fuel and water (the digester conserves water and reduces trips to gather water and firewood) + Negative respiratory health effects from traditional wood-fuel stoves 	Uganda	Green Heat
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Time poverty from collecting fuel and water (increased access to water near or at the home) + Gender-based violence (reduction in violence that takes place during travel to and from the home) <p>Limitations</p> <ul style="list-style-type: none"> · Utilizes mobile money to pay for set amount of water; limited mobile phone penetration in Ethiopia 	Gambia, Tanzania	eWaterPay
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Time poverty from collecting fuel and water (charcoal briquettes producing hydraulic jacks reduce or eliminate need to gather wood-fuel outside home) + Gender-based violence + Youth unemployment 	Uganda	Development Innovation Ventures
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Time poverty from collecting fuel and water + Limited water in areas affected by drought <p>Limitations</p> <ul style="list-style-type: none"> · Skysource/Skywater was recently selected as the winner and there have been limited deployments of the invention thus far 	N/A	XPRIZE
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Time poverty from collecting fuel and water (increases time available to girls and women for productive activities through rural electrification) + Unemployment (provides jobs in management, installation, maintenance, small enterprise, and more) <p>Limitations</p> <ul style="list-style-type: none"> · Utilizes mobile money to provide energy on credit; limited mobile phone penetration in Ethiopia 	Kenya, Tanzania, Uganda	International Center for Research on Women

#	Case study	Description
General		
24	mSTAR	The Mobile Solutions Technical Assistance and Research (mSTAR) program advances mobile solutions and attempts to close the gender gaps that prevent or delay access to and adoption of mobile technology. The mSTAR program supports wide, coordinated action along a value chain of market stakeholders, including governments, donors, nongovernmental organizations (NGOs), mobile service providers, and their customers. The mSTAR program is designed to catalyze game-changing interventions to support, improve, and scale access to mobile money, mobile access, and mobile data collection and dissemination.
25	Digital Livelihoods: Youth and the Future of Work at Scale	The Digital Livelihoods: Youth and the Future of Work at Scale project seeks to scale up established financial and economic programming, social and technological innovations, and empowerment and leadership development skills training to assist 200,000 young women and men. It employs a comprehensive gender equality strategy based on realities of the local contexts and builds on lessons- learned from previous Digital Opportunity Trust projects.
26	Design for Girls, by Girls. Period.	UNICEF widely employs a 'human-centered design' social innovation approach that incorporates young girls' and boys' perspectives at every step of the design process for solutions to address development challenges. An innovative 'human-centered design' process is being used at UNICEF Pakistan to design more gender-equitable program solutions targeting gender issues, such as menstrual health and hygiene management (MHM).

Gender component/constraints addressed	Countries of operation	Implementing partner
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Gender divide in access to ICTs + Functionality of other mobile-based innovations 	<p>Bangladesh, India, Liberia, Mozambique</p>	<p>FHI 360</p>
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Gender divide in access to ICTs + Entrepreneurial training 	<p>Ghana, Kenya, Malawi, Morocco, Rwanda, Senegal, Tanzania, Zambia</p>	<p>Digital Opportunity Trust</p>
<p>Constraints addressed</p> <ul style="list-style-type: none"> + Lack of participation and agency among girls in development projects 	<p>N/A</p>	<p>UNICEF Pakistan</p>

Appendix A: Sample Descriptive Statistics

APPENDIX A1. ETHIOPIA SOCIOECONOMIC SURVEY (ESS) SAMPLE

	Total	Rural	URBAN	
			Small town	Large town
Panel A. ESS sample wave 1 (2011–2012)				
Number of enumeration areas	333	290	43	N/A
Number of households	3,969			
SHARE BY REGION				
Tigray	23%	10%	9%	N/A
Afar	10%	3%	5%	N/A
Amhara	56%	21%	26%	N/A
Oromiya	54%	19%	26%	N/A
Somali	17%	7%	7%	N/A
Benishangul-Gumuz	7%	3%	2%	N/A
SNNP	58%	26%	23%	N/A
Gambella	7%	3%	2%	N/A
Harari	3%	3%	0%	N/A
Dire Dawa	3%	3%	0%	N/A

APPENDIX A1. ETHIOPIA SOCIOECONOMIC SURVEY (ESS) SAMPLE

Panel B. ESS sample wave 2 (2013–2014) and wave 3 (2015–2016)

Number of enumeration areas	433	290	43	100
Number of households	5,469			
SHARE BY REGION				
Tigray	11%	10%	9%	15%
Afar	3%	3%	5%	1%
Amhara	20%	21%	23%	15%
Oromiya	20%	19%	23%	20%
Somali	6%	7%	7%	3%
Benishangul-Gumuz	3%	3%	2%	0%
SNNP	23%	26%	23%	15%
Gambella	3%	3%	2%	1%
Harari	3%	3%	2%	3%
Dire Dawa	4%	3%	2%	7%
Addis Ababa	5%	N/A	N/A	20%

APPENDIX A2. GENDER GAP IN AGRICULTURAL PRODUCTIVITYⁱ

Variable	AGRICULTURAL GAP		
	(1)	(2)	(1) - (2)
	Male	Female	Difference
MAIN OUTCOME			
Self-reported productivity (logarithm)	8.5	8.1	0.359***
INDIVIDUAL CHARACTERISTICS			
Age (years)	46.8	51.4	-4.541***
Relationship with head of household			
Head of household	98%	96%	0.022***
Spouse of the head of household	0%	3%	-0.026***
Son/daughter of the head of household	2%	0%	0.012**
Other relative	0%	1%	-0.008***
Civil status			
Married	94%	24%	0.704***
Widowed/divorced	4%	74%	-0.701***
Single	2%	2%	-0.003
Education			
Illiteracy rate	59%	88%	-0.295***
Read and write (no school at all)	13%	4%	0.092***
Completed primary	22%	5%	0.169***

i Values in appendixes A2, A3, and A4 are rounded to the nearest tenth.

Variable	Male	Female	Difference
Completed secondary	4%	2%	0.023***
Diploma or certificate	1%	0%	0.005
University degree	1%	0%	0.005
Individual disability ⁱⁱ	11%	17%	-0.063***
Hours in the last seven days spent on			
Agricultural activities	15.9	9.7	6.220***
Non agricultural household business	2.1	1.8	0.371
Casual, part-time, or temporary labor	1.3	0.9	0.441
Wage, salary, any payment (excluding temporary)	1.4	0.5	0.983***
Unpaid apprenticeship	0.0	0.0	0.024
HOUSEHOLD CHARACTERISTICS			
Household ever received formal credit	26%	17%	0.090***
Household size	5.8	3.8	1.925***
Child dependency ratio (under 10) ⁱⁱⁱ	0.7	0.6	0.141***
Wealth index ^{iv}	-0.3	-0.5	0.196**
MANAGER CHARACTERISTICS (AGRICULTURE)			
Attended extension programs	44%	33%	0.106***
Distance of the household to closest market (km)	67.1	64.4	2.694

ii Individual disability: Manager/worker reported to be absent from usual activity due to this illness/injury at some point during the last month.

iii The dependency ratio definition used throughout the report is number of children below age 10 over number of individuals above age 10 in a household.

iv Wealth index was built using principal component analysis. The variables included in the analysis are a set of variables that capture living standards such as household ownership of durable assets (e.g., TV), dwelling ownership, infrastructure, and housing characteristics (source of water, sanitation facility, source of energy, number of room per capita).

Variable	Male	Female	Difference
More than half of the household production sold	3%	3%	0.003
Manager has non agriculture labor income	17%	28%	-0.107***
Total land managed (hectares)	1.0	0.5	0.408***
Number of fields managed	11.2	8.5	2.783***
Number of plots managed	3.6	2.6	0.992***
MANAGER'S PLOT/FIELD CHARACTERISTICS			
Land under certificate (% of total) ^v	46%	46%	-0.002
Manager's plot occupation: rented (% of fields)	4%	2%	0.020***
Intercropping (% of fields) ^{vi}	16%	16%	-0.003
Average plot slope	12.2	11.5	0.670*
Plot distance to household	1.2	0.6	0.609
MANAGER'S AGRICULTURAL NON LABOR INPUT USE			
Fields that use irrigation (% of total)	4%	3%	0.003
Fields that use fertilizer (% of total)	35%	36%	-0.007
Fields that use organic fertilizer (% of total)	1%	2%	-0.009**
Fields that use pesticide, herbicide, or fungicide (% of total)	10%	8%	0.018**
Fields that use improved seeds (% of total)	4%	4%	0.006
Chemical fertilizer used per hectare (kg/ha)	117.8	97.7	20.14
Oxen per hectare	1.4	1.0	0.329

v Formal certification is created using the question *Does your household have a certificate for this [PARCEL]?*

vi Intercropping refers to planting more than one crop on a single field (the alternative to intercropping is having a pure-stand field).

vii Agricultural index is created using principal component analysis and dummies of holding of the following resources: sickle, axe, pickaxe, traditional plough, modern plough, water pump, and agricultural livestock availability.

Variable	Male	Female	Difference
Agriculture implemented access index ^{vii}	0.4	-0.2	0.631***
MANAGER'S AGRICULTURAL LABOR INPUT USE			
Total number of hours worked by household members (hours/ha)	234.8	154.1	80.752***
Total hired labor use (days/ha)	13.9	5.4	8.569
Total exchange labor use (days/ha)	15.9	34.0	-18.093***
CROP CHOICE			
Total number of crops harvested	5.4	4.4	0.926***
Food crop (% of total crops harvested)	62%	59%	0.023
Cash crop (% of total crops harvested)	14%	12%	0.018
Horticulture (% of total crops harvested)	6%	7%	-0.007
Nuts, peas, and beans (% of total crops harvested)	9%	9%	0.003
Spice and oil seed (% of total crops harvested)	2%	2%	0.002
Other (% of total crops harvested)	7%	10%	0.031
Crop damage	85%	82%	0.029*
GEOGRAPHICAL LOCATION			
Rural	100%	100%	0
Tropic-warm/semi-arid	5%	4%	0.01
Tropic-cool/semi-arid	31%	33%	-0.019
Tropic-cool/subhumid	43%	38%	0.050**
Tropic-cool/humid	18%	21%	-0.033*
Observations	2,289	618	2,907

APPENDIX A3. GENDER GAP IN SALES FROM SELF-EMPLOYMENT

Variable	SELF-EMPLOYMENT GAP		
	(1)	(2)	(1) - (2)
	Male	Female	Difference
MAIN OUTCOME			
Total monthly sales (logarithm)	8.26	7.47	0.791***
SECONDARY VARIABLES			
Average monthly operating costs (log)			
Wages	1.2	0.6	0.682***
Purchase of goods for sale	4.2	3.3	0.838***
Raw materials	3.1	3.8	-0.757***
Transportation	2.9	2.0	0.881***
Other costs	3.1	2.2	0.906***
Total costs	7.2	6.7	0.528***
INDIVIDUAL CHARACTERISTICS			
Age (years)	39.4	39.7	-0.3
Relationship with head of household			
Head of household	84%	56%	0.286***
Spouse of the head of household	3%	32%	-0.288***
Son/daughter of the head of household	10%	10%	0.007
Other relative	3%	3%	-0.003

Variable	Male	Female	Difference
Civil status			
Married	83%	40%	0.421***
Widowed/divorced	5%	48%	-0.431***
Single	13%	12%	N/A
Education			
Illiteracy rate	30%	58%	0.28***
Read and write (no school at all)	11%	9%	0.028*
Completed primary	33%	19%	0.142***
Completed secondary	19%	11%	0.077***
Diploma or certificate	4%	2%	0.023**
University degree	2%	1%	0.013**
Individual disability	9%	12%	-0.035**
Hours in the last seven days spent on			
Agricultural activities	7.2	5.5	1.662**
Non agricultural household business	22.7	16.8	5.998***
Casual, part-time, or temporary labor	2.8	1.4	1.383**
Wage, salary, any payment (excluding temporary)	1.9	1.4	0.49
Unpaid apprenticeship	0.3	0.0	0.287
HOUSEHOLD CHARACTERISTICS			
Household ever received formal credit	28%	24%	0.040*
Household size	5.3	4.6	0.703***

Variable	Male	Female	Difference
Child dependency ratio (under 10)	0.6	0.5	0.090***
Wealth index	0.11	-0.39	0.499***
GEOGRAPHICAL LOCATION			
Rural	51%	53%	-0.025
Small town	16%	13%	0.03
Medium and large town	33%	34%	-0.005
MANAGER OF ENTERPRISE CHARACTERISTICS^{viii}			
Number of enterprises under principal manager	1.2	1.1	0.085***
Work with another manager	66%	9%	0.571***
Number of years that enterprise has been operating	15.5	15.4	0.153
Enterprise has a license	0.4	0.1	0.228***
Are the activities of this enterprise seasonal?	0.3	0.3	0.066***
Total number of hired workers under manager	0.6	0.3	0.321**
Formal credit	0.1	0.0	0.037***
Amount borrowed for enterprises under manager	1,422.0	628.6	793.419***
Amount repaid on loans for enterprises under manager	1,181.3	406.9	774.421***
Client of manager is: local consumers, market, traders, and cooperative	97.2%	99.5%	-0.023***
Client of manager is: NGO or governments	3.9%	0.6%	0.033***
Client of manager is: other	3.4%	2.5%	0.009

viii When a manager manages more than one enterprise we use the following: Mean of the number of years that enterprises have been operating, at least one enterprise has a license, at least one of the enterprises has seasonal activity, at least one enterprise acquired a credit.

Variable	Male	Female	Difference
WORK INDUSTRY (OF THE EMPLOYEE)			
Agriculture production	10%	5%	0.050***
Services	38%	33%	0.055**
Manufacturing	14%	34%	-0.201***
Trade	38%	31%	0.072***
Other	8%	1%	0.062***
Observations	961	639	1,600

APPENDIX A4. GENDER GAP IN WAGE EARNINGS

Variable	WAGE GAP		
	(1)	(2)	(1) - (2)
	Male	Female	Difference
MAIN OUTCOME			
Total hourly wage (logarithm)	3.4	2.9	0.438***
INDIVIDUAL CHARACTERISTICS			
Age (years)	36.5	31.7	4.751***
Relationship with head of household			
Head of household	69%	38%	0.307***
Spouse of the head of household	4%	31%	-0.270***
Son/daughter of the head of household	19%	18%	0.014
Other relative	8%	13%	-0.051***
Civil status			
Married	65%	45%	0.191***
Widowed/divorced	6%	22%	-0.158***
Single	29%	33%	-0.033
Education			
Illiteracy rate	11%	13%	-0.023
Read and write (no school at all)	6%	5%	0.01
Completed primary	24%	18%	0.066***

Variable	Male	Female	Difference
Completed secondary	28%	32%	-0.038
Diploma or certificate	13%	22%	-0.096***
University degree	20%	12%	0.081***
Individual disability	8%	12%	-0.044***
Hours in the last seven days spent on			
Agricultural activities	2.5	1.0	1.584***
Non agricultural household business	2.3	2.0	0.377
Casual, part-time, or temporary labor	1.6	0.9	0.724*
Wage, salary, any payment (excluding temporary)	28.3	28.6	-0.284
Unpaid apprenticeship	0.3	0.5	-0.117
HOUSEHOLD CHARACTERISTICS			
Household ever received formal credit	20%	18%	0.029
Household size	5.2	4.7	0.456***
Child dependency ratio (under 10)	0.4	0.4	0.067**
Wealth index	2.9	3.8	-0.901***
GEOGRAPHICAL LOCATION			
Rural	27%	17%	0.101***
Small town	13%	12%	0.007
Medium and large town	61%	71%	-0.108***

Variable	Male	Female	Difference
WORKER/EMPLOYEE CHARACTERISTICS			
Did casual labor in the last 12 months?	8%	2%	0.060***
Employee worked for other households for free?	13%	13%	0.003
Employee has a secondary job	3%	2%	0.007
Employer is private company or individual	48%	44%	0.034
Employer is government	47%	51%	-0.036
Employer is church/religious organization	3%	3%	0.006
Was employed as temporary labor by the Productive Safety Net Program (PSNP)?	2%	0%	0.015**
WORK INDUSTRY (OF THE EMPLOYEE)			
Agricultural production	10%	6%	0.039**
Services	36%	37%	-0.013
Mining	1%	0%	0.010*
Manufacturing	8%	12%	-0.034**
Construction	13%	6%	0.077***
Trade	4%	5%	-0.006
Education	15%	19%	-0.044**
Other	22%	24%	-0.025
Observations	1,347	843	504

Appendix B: Decomposition Methods

The main purpose of decomposition methods is to partition the overall difference of a given distribution between two groups, group A and group B.ⁱ In this diagnosis, group A will be women (women farm managers, business managers, or employees) and group B will be men (men farm managers, business managers, and employees).

The standard assumption used in these decompositions is that the outcome variable Y is linearly related to the covariates, X , and that the error term v is conditionally independent of X .

$$Y_{gi} = \beta_{g0} + \sum_{k=1}^K X_{ik} \beta_{gk} + v_{gi}, \quad g = A, B.$$

Where $E(v_{gi}|X_i) = 0$ and X is the vector of covariates. The overall difference in average outcomes between groups B and A is $\hat{\Delta}_O^\mu = \bar{y}_B - \bar{y}_A$,

which means
$$\hat{\Delta}_O^\mu = (\hat{\beta}_{BO} - \hat{\beta}_{AO}) + \sum_{k=1}^K \bar{X}_{Bk} (\hat{\beta}_{Bk} - \hat{\beta}_{Ak}) + \sum_{k=1}^K (\bar{X}_{Bk} - \bar{X}_{Ak}) \hat{\beta}_{Ak}$$

where
$$\hat{\Delta}_s^\mu(\text{Unexplained}) = (\hat{\beta}_{BO} - \hat{\beta}_{AO}) + \sum_{k=1}^K \bar{X}_{Bk} (\hat{\beta}_{Bk} - \hat{\beta}_{Ak})$$

$$\hat{\Delta}_x^\mu(\text{Explained}) = \sum_{k=1}^K (\bar{X}_{Bk} - \bar{X}_{Ak}) \hat{\beta}_{Ak}$$

ⁱ This appendix is based mainly on the analysis presented in the *Handbook of Labor Economics, Volume 4*, part A, pages 1–102, chapter 1: Decomposition Methods in Economics (Fortin, Lemieux, and Firp 2011) and the report *Levelling the Field* (O’Sullivan et al. 2014).

And $\hat{\beta}_{g0}$ and $\hat{\beta}_{gk}$ ($k = 1, \dots, K$) are the estimated intercept and slope coefficients, respectively, of the regression models for groups A and B.

The overall decomposition $\hat{\Delta}_O^\mu$ and its two components $\hat{\Delta}_S^\mu$ structural effect (unexplained) and $\hat{\Delta}_X^\mu$ composition

effect (explained by differences in covariates) are identified with the aggregate decomposition. The detailed decomposition involves subdividing both components into the respective contributions of each covariate, $\hat{\Delta}_{S,k}^\mu$ and $\hat{\Delta}_{X,k}^\mu$ for $k=1 \dots K$.

Oaxaca-Blinder-decomposition of mean productivity differentials

$$Y_g = X\beta_g + v_g$$

where $E[v_g | X] = 0$. Letting $D_B = 1$ be an indicator of group B (men plot managers) and taking the expectations over X , the overall mean productivity gap $\hat{\Delta}_O^\mu$ can be written as

$$\hat{\Delta}_O^\mu = E[Y_B | D_B = 1] - E[Y_A | D_B = 0]$$

$$\hat{\Delta}_O^\mu = E[E(Y_B | X, D_B = 1) | D_B = 1] - E[E(Y_A | X, D_B = 0) | D_B = 0]$$

$$\hat{\Delta}_O^\mu = E[X | D_B = 1]\beta_B + E[v_B | D_B = 1] - (E[X | D_B = 0]\beta_A + E[v_A | D_B = 0])$$

Where $E[v_A | D_B = 0] = E[v_B | D_B = 1] = 0$. Adding and subtracting the average counterfactual productivity that group B (women) would have obtained under the productivity structure of group A (men), $E[X | D_B = 1]\beta_A$, the expression becomes:

$$\hat{\Delta}_O^\mu = E[X | D_B = 1]\beta_B - E[X | D_B = 1]\beta_A + E[X | D_B = 1]\beta_A - E[X | D_B = 0]\beta_A$$

$$\hat{\Delta}_O^\mu = E[X | D_B = 1](\beta_B - \beta_A) + (E[X | D_B = 1] - E[X | D_B = 0])\beta_A$$

$$\hat{\Delta}_O^\mu = \hat{\Delta}_S^\mu + \hat{\Delta}_X^\mu$$

Replacing the expected value of the covariates $E[X | D_B = d]$, for $d=0,1$, by the sample averages \bar{X}_g , the decomposition is estimated as

$$\hat{\Delta}_O^\mu = \bar{X}_B \hat{\beta}_B - \bar{X}_B \hat{\beta}_A + \bar{X}_B \hat{\beta}_A - \bar{X}_A \hat{\beta}_A$$

$$\hat{\Delta}_O^\mu = \bar{X}_B (\hat{\beta}_B - \hat{\beta}_A) + (\bar{X}_B - \bar{X}_A) \hat{\beta}_A$$

$$\hat{\Delta}_O^\mu = \hat{\Delta}_S^\mu + \hat{\Delta}_X^\mu$$

The first term in the equation $\hat{\Delta}_S^\mu$ is the structure effect (unexplained, or the part due to discrimination) while the second term is the composition effect $\hat{\Delta}_X^\mu$.

In practice, we computed it by plugging in the sample means and the OLS estimates $\hat{\beta}_g$ in the above formula.

Interpretation of the Oaxaca-Blinder decomposition in the current context

The **Oaxaca-Blinder decomposition** is a statistical method that explains the difference in the means of a dependent variable between two groups by decomposing this gap into two parts:

The Endowment Effect (Explained)

Explains the differences between men and women in terms of factors of production such as years of experience, total inputs, or access to credit. It refers to the differences in the quantities or levels of resources used in plots by male managers compared to women managers.

In other words, this is the portion of the gender gap attributable to the quantity or level of resources that can be reduced by ensuring that women receive the resources they lack, relative to men.

The Structural Effect (Unexplained)

Captures the return to resources. The differences in what is obtained from a given amount of a factor of production, e.g., the difference in productivity that the men obtain compared with women who have exactly the same years of experience or who use the same total amount of inputs.

Even when men and women farm managers have access to the same quantities of resources, they do not achieve the same results. Providing women farmers with the same resources will not necessarily reduce the structural portion of the gender gap. Policies need to address broader issues of constraints faced by women managers. In other words, this part captures a discrimination component and the unobservable variables.

ENDNOTES

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