

How Do Women Fare in Rural Non-Farm Economy?

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Abstract

This paper studies the gender-based differences in access to and return from economic activities in the rural non-farm economy (RNFE) using panel datasets from Uganda and Ethiopia. The results show that female-headed households have limited access to paid employment and self-employment in the sector, particularly in some industries.

These households also earn lower returns from RNFE than male-headed households, and the gross return gap is much higher in Uganda than in Ethiopia. Furthermore, endowment differences do not explain the return gap in Ethiopia, and only partially explain the gap in Uganda.

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1. Introduction

A significant number of households throughout sub-Saharan Africa (SSA) engage in rural non-farm economy (RNFE), either through employment in the sector or self-employment by establishing microenterprises. Such diversification in investment and labor allocation is prevalent throughout rural settings in SSA (Reardon et al., 1992; Reardon, 1997; Barrett et al., 2001; and World Bank, 2007). A range of plausible explanations for this extensive prevalence of diversification in livelihoods have been put forward: *ex-ante* risk mitigation (Barrett et al., 2001; Reardon, 1997) and *ex-post* risk management (Webb and Reardon, 1992 and Reardon et al., 1992); missing or incomplete market for land, labor, insurance and credit (Barrett et al., 2001); seasonality in agriculture (Reardon, 1997; Barrett et al., 2001); and complimentary of activities and economies of scope (Barrett et al., 2001). It has been documented that non-farm income constitutes a huge portion of rural income in the continent (Reardon et al. 1998: cited in Lanjouw et al., 2001). On the other hand, until recently, poverty reduction strategies in SSA have not given due emphasis to RNFE and the focus has predominantly been on improving productivity in the agricultural sector. This conscious focus on agriculture is, arguably, misplaced (Rigg, 2006), and that the role played by off-farm activities in improving welfare and socioeconomic mobility is crucial (Haggblade et al., 2010; Davis et al., 2010; Rigg, 2006; Bezu et al., 2012).

There is also ample evidence supporting the hypothesis that RNFE offers a decent alternative income source, and improves well-being (Lanjouw et al., 2001; Bezu et al., 2012; Block and Webb, 2001). RNFE appears to offer an important route out of poverty (Lan, 2007; Lanjouw et al., 2001), and participation in the sector facilitates growth, and hence upward mobility (Bezu et al., 2012). According to Block and Webb (2001), initial diversification leads to subsequent boosts in households' income in rural Ethiopia. Therefore, it is imperative to understand whether women are taking advantage of these rewarding economic activities.

However, the extent of women’s engagement in and their returns from RNFE is not clearly documented, and previous studies seem to offer contrasting accounts. Some of the evidence suggests that women have a lower level of diversification outside agriculture and their returns from engagement in RNFE tends to be lower than men’s (Lanjouw et al., 2001; Block and Webb, 2001; and Canagarajah et al., 2001). Lanjouw et al. (2001) found that women in Tanzania appear to be poorly placed in RNFE, and business returns are 60 times higher for men than for women. Similarly, Block and Webb (2001) found that, in Ethiopia, twice as many female-headed households as male-headed ones identified off-farm employment as important, and yet they tend to have lower levels of income diversification away from cropping. Women earned less (than men) in RNFE of Ghana and Uganda as well, and yet being a female household-head contributed better to non-farm earnings (Canagarajah et al., 2001). On the other hand, Bezu et al. (2012) and Djurfeldt et al. (2013) found that women have better access to and receive higher returns from off-farm activities. In RNFE, female labor enjoys higher returns than male labor, and RNFE offers opportunity for (female) labor, which is underutilized in agriculture (Bezu et al., 2012). In Zambia and Malawi, male-headed households also have relatively limited access to RNFE, and the high RNFE income for females seems to bridge the gender-gap in farm income (Djurfeldt et al., 2013).

These previous studies have identified gender gaps in non-farm incomes. However, they fall short of tracing the sources of the return gaps as they do not identify the gap resulting from differences in resource endowments or marginal returns to these endowments. The current study applies Heckman correction for selection bias and then conducts return decomposition—identifying gaps due to endowment differences from gaps due to marginal return to endowments. In addition, this study contributes to a rarely explored aspect of RNFE by analyzing the industrial classification of non-farm activities. For a number of socio-cultural reasons women’s participation in some industries of the non-farm sector might be limited. This could potentially affect returns

from RNFE. The main objective of this study, therefore, is to investigate the gender dimension of RNFE and provide policy relevant insight on factors associated with gender gaps in Uganda and Ethiopia. Out of the four Eastern and Southern Africa countries (Uganda, Tanzania, Malawi and Ethiopia) covered by the Living Standards Measurement Study–Integrated Surveys on Agriculture (LSMS-ISA), the data used in this paper, these two countries are interesting to compare. Both are landlocked and heavily dependent on agriculture, a sector in which men and women tend to have distinct roles and certain agricultural activities such as ploughing are reserved for men in Ethiopia. However, despite their geographic proximity and other similarities, RNFE is much more important in Uganda than in Ethiopia. Therefore, these two countries provide a good comparison for studying gender gaps in similar countries where the development of the non-farm sector is at different stages.

The current study addresses the following inter-related questions: Do women have equal access to high return economic activities in RNFE of Uganda and Ethiopia? Does the gender difference in access to RNFE vary by industry? Is there a gender gap in returns from RNFE? If so, do differences in resource endowments explain the earnings gap? While addressing these questions, this study attempts to deal with the two major limitations common to most of the previous studies: (1) failure to account for selection bias; and (2) reliance on sample of households that are not nationally representative, with the exception of a few studies. The current study deals with these shortcomings by conducting Blinder-Oaxaca decomposition (Blinder, 1973; Oaxaca, 1973) of returns with Heckman correction for selection problem (Heckman, 1976; Heckman, 1979). We study the non-farm sector in these two countries using the LSMS-ISA, which is a national representative and internationally comparable household survey. After providing a general mapping of participation in and income from RNFE, we investigate gender-based differences in access to RNFE and the types of industries that female-headed households typically engage in. Then, we analyze gender inequality in returns from off-farm activities by implementing bias-corrected Blinder-Oaxaca decomposition.

The descriptive results show that returns from RNFE account for a fairly large share of household income in Uganda and Ethiopia. The significance of RNFE is more pronounced in Uganda, where almost half of gross household income originates from off-farm activities. In Ethiopia, only 26 percent of gross household income is from off-farm activities. There are also significant gender gaps in access to salaried employment and self-employment in RNFE.

Results from decomposition of returns reveal that female-headed households benefit less from engagement in RNFE. For instance, female-headed households in Ethiopia earned 29 percent less gross return than male-headed households. The gross return gaps are even higher in Uganda (61 percent). The return gaps are also much higher when we focus exclusively on households in rural areas compared to when we include households in both rural areas and small towns (henceforth ‘rural⁺ areas’). The return gaps are further decomposed into ones that are explained by differences in endowments and those that are unexplained and hence could be the result of gender bias. The results show that, in Ethiopia, the major portion of the gender gap in return is not explained by differences in endowments in both rural and rural⁺ areas. In Uganda, we find different results in rural areas and rural⁺ areas. In rural areas, a large proportion of the gender gap is the result of differences in endowments. Whereas, in rural⁺ areas, we find that the return gap is only partially explained by endowment differences.

The rest of this paper is organized as follows. Section 2 briefly describes the data and measurement. Section 3 describes the empirical strategy employed. Section 4 presents the results. Finally, Section 5 presents the conclusion and policy recommendation.

2. Data and Measurement

2.1. Data

This study uses nationally representative and internationally comparable panel data from the LSMS-ISA in Ethiopia and Uganda. In Ethiopia, the survey includes 3,969 households, which are representative of rural areas and small towns. These households were surveyed in 2011/12 and 2013/14. For Uganda, we use two rounds of a nationally representative survey which interviewed 2,716 households in 2010/11 and 2011/12. As this study focuses on rural areas and small towns, we exclude Kampala from our analysis.

2.2. Measurement

The approach adopted in this study to characterize diversification is straightforward. We classify labor allocation and income into on-farm and off-farm. On-farm refers to engagement in crop-production and animal husbandry on own farm. Off-farm encompasses engagement in paid economic activities outside the domain of one's own farm, by working for wage and salary, as a casual laborer and/or by establishing and operating non-farm enterprise(s).

We adopt various measures of off-farm engagement by exploring the size and share of gross and net off-farm income; and labor-days in off-farm activities and their share in households' labor supply:¹ (1) *Gross on-farm income* includes total income from crop, livestock and their byproducts sold and used for own consumption.^{2,3} (2) *Net on-farm*

¹The definition of each measure slightly varies by country, due to differences in information availability.

²There is no data on the amount of crop harvested in the first round of Ethiopia's LSMS-ISA, and hence we have relied on crop disposal mechanisms (sell, giving out for free, storage for consumption and/or seed) to impute on-farm income. As a result, we could not account for the amount consumed between harvest time and the time when the households were surveyed.

³For Uganda, we include income from livestock services such as transportation under on-farm income.

income refers to gross income minus production cost such as wagebill for hired labor used in planting and harvesting crop; expenditure on transportation, seed, fertilizer, and land rental; expenses incurred to feed, vaccinate and look after livestock as well as transportation of livestock and byproducts. (3) *On-farm labor* is the total days of (own, hired and shared) labor deployed for agricultural activities on own farm.⁴ (4) *Gross off-farm income* is income from employment for wages/salaries and as a casual laborer; and gross return from non-farm enterprise.⁵ (5) *Net off-farm income* encompasses the incomes from wage/salaried employment and casual labor; and net income from enterprises. (6) *Off-farm labor* refers to the total number of days spent on wage/salaried and casual employment as well as own and hired labor-days spent on running non-farm enterprise.^{6,7}

To convert agricultural production into revenue and labor days into farm wagebill, we used median prices of outputs and wage rate at the lowest admin division (*'kebele'*), whenever data is available. Otherwise, median prices and wages in higher admin divisions like *'woreda'*/district, zone and even region have been adopted. This price and wage conversion applies only to agricultural incomes and expenses that are used to construct total household income—against which share of off-farm income is imputed. This construction of revenue and wage bill is not applied to off-farm income. Therefore, it does not affect the off-farm return analysis. Value of land is imputed based on farmers' response to a hypothetical question regarding rental value of their own farmed parcel(s), and rental cost of land rented from others.

⁴Labor accounting is also based on aggregating labor days by men, women and children at equal weight. Labor data on livestock is not detailed enough to properly account for labor spent to looking after livestock.

⁵In Ethiopia, off-farm income includes income from working under the public safety-net program (PSNP).

⁶For Ethiopia, labor allocated for PSNP is included under off-farm labor.

⁷In Uganda, we do not have information on days allocated to operating non-farm enterprises.

2.3. Income from RNFE

Here, we briefly describe the gender based differences in return from RNFE and differences in relevant characteristics such as human and physical capital, exposure to shocks and access to public services. Table A.1 presents the gap in these variables. In both Ethiopia and Uganda, female household heads tend to be older with less education, compared to male heads. Female-headed households have fewer members, but high dependency ratio. This high dependency ratio could limit female-headed households' participation in RNFE, for example, by limiting their ability to operate a non-farm enterprise farther from residence such as in a nearby market. Similarly, compared to male-headed households, female-headed ones have less physical capital such as land and cattle in both countries. More female-headed households have been exposed to natural shocks in Uganda. Overall difference in exposure to shocks and their frequency is not economically and/or statistically significant. On the other hand, there is no statistically significant gender based difference in access to public services.

Women become household heads under different circumstances. In hierarchical rural communities, like those covered in this study, male spouses typically tend to be the household heads whenever they are present in the households. For instance, in both Uganda and Ethiopia, most of the female-heads (more than 70 percent) are either widow/divorced or never married. Whereas, about 95 and 89 percent of male-heads are married in Ethiopia and Uganda, respectively (Table A.2). The situation under which females become household heads could also dictate their participation and return from RNFE. Therefore, this study attempts to document the heterogeneity in participation and return between male- and female-headed households with different marital status.

The role of off-farm activities in generating income for rural households and employing their labor is significant in both countries. However, it is more pronounced in Uganda, where about 49 percent of household income originates from off-farm activities.

The average annual off-farm income per person is 965 thousand Ugandan Shillings (UShs).⁸ The magnitude and share of off-farm income in Ethiopia is relatively small, and yet it is economically significant. The national average annual gross off-farm income is 1,124 Ethiopian Birr (ETB) per capita, which is about 26 percent of the total household income.⁹ Only 17 percent of labor time (18 days per person per year) is allocated to off-farm activities. This is much lower compared to Uganda, where households allocate 69 percent of their labor time (76 workdays per person per year) to off-farm activities (Table A.3 in the Annex).

In addition, there are marked regional differences in the role of off-farm activities in both countries. For instance, households in the Central Region of Uganda earn by far the largest per person off-farm income in the country, with average annual income of UShs 2.4 million, and off-farm income makes 71 percent of households' income. This substantially higher off-farm income in the region could, partly, be the result of proximity to Kampala.^{10,11} The other three regions in Uganda have similar level of off-farm income, ranging from UShs 0.7 million to 0.9 million, and comparable share of income originates from and labor is allocated to off-farm activities. In Oromia, Southern Nations & Nationalities, and Amhara regions of Ethiopia—the regions with better agricultural potentials—households rely less on off-farm activities. In these regions, lower share of household income is earned from and lesser labor time is allocated to off-farm activities. Households residing in low agriculture potential regions such as Tigray and others (Afar, Somali, Benshangul Gumuz, Dire Dawa, Gambella, and Harari) garner a significant amount and large share of their incomes from off-farm activities and also

⁸The annual average of official exchange rates for 2010, 2011 and 2012 were 2,523, 2,505 and 2,587 UShs/\$, respectively (WDI, 2014).

⁹Average annual exchange rates for the years 2011 and 2012 were 17 and 18 ETB/\$, respectively (WDI, 2014).

¹⁰Smith et al. (2001) compared households in Central and Eastern regions, and found a similar pattern— higher proportion of households in the Central Region tend to have more diversified livelihoods.

¹¹In addition, Central Uganda is wealthier than the other regions, and previous studies concur with our findings (see Sarah and Ibrahim (2012).)

allocate a significant share of their labor time to off-farm activities (Table A.3).

Returning to the gender dimension of RNFE, we conducted extensive analysis of how female-headed households fare in the sector relative to their male-headed counterparts. In Table A.4, we present a comparison of participation and returns from RNFE, and household- and community-specific covariates that could influence access to and income from RNFE by gender. Per capita gross return from RNFE is presented for all households as well as for only those households that are participating in the sector. Both in Uganda and Ethiopia, when considering average off-farm income of all households, there is no statistically significant difference in per capita gross return for female- and male-headed households. However, among households participating in RNFE, female-headed households tend to earn lower returns in both countries.

Another striking result is that even if female-headed households earn lower returns from off-farm activities, a higher share of their incomes originate from these activities. For instance, 36.5 percent of female-headed households' incomes come from RNFE in Ethiopia. This is much higher when compared to the 23.4 percent among male-headed households. This result is consistent with the stated share of return from non-farm enterprises in total household income: about 32 percent of female-headed households that own non-farm enterprises stated that they earn 50 percent or more of their incomes from these enterprises. This is much higher than the 20 percent of male-headed households that reportedly earned at least 50 percent of their incomes from enterprises (Figure A.1 in the Annex). It should also be noted that female-headed households in Ethiopia allocate a higher share of their labor to off-farm activities. In Uganda, female-headed households also earn a higher share of their incomes from and allocate more labor days to off-farm activities, but they tend to spend lesser share of their labor on these activities.

The gender gap in access to and return from RNFE might be the result of differences

in human and physical capital endowments, exposure to shocks, community specific factors such as access to market and roads, and climatic conditions. Table A.4 presents differences in these potential drivers of access and return. In both Uganda and Ethiopia, female-headed households have lower human capital endowments: their heads are older and less educated; and they have a smaller household size and high dependency ratio. They also own smaller plots of land, but their livestock ownership is relatively higher. In terms of exposure to natural and health shocks, and the frequency of these shocks, there is little difference between these groups. The same is true for community-level indicators of access to market and roads.

2.4. Differential Access to RNFE by Industry

Rural off-farm activities vary significantly in terms of their industrial classifications, and economic activities in different industries could have substantially different returns. A clear understanding of the gender differences in industry of employment could provide at least a partial explanation for any gender gap in returns from RNFE. Evidently, some investments and employment opportunities, especially those with higher returns, could be more difficult to access. They might require higher start-up capital and/or know-how. For example, a non-agricultural business could be more rewarding than operating an enterprise that processes agricultural output. But the former may also require higher start-up capital. Jobs in the manufacturing, transport and communications, and construction sectors could be more rewarding than jobs in the primary sector. But such jobs tend to require certain specialized training or skills. Similarly, some households might be pulled into RNFE by the desire to increase their earnings/profits by engaging in more rewarding economic activities. Others might be pushed into the sector due to unfavorable agriculture outcomes, and their participation in the sector could just be a coping mechanism. The latter group of households might tend to participate in less rewarding and potentially easy to access off-farm activities. Therefore, inspecting

the nature and industry of employment and non-farm enterprise is very important. To explore the gender differences in the industry of salaried employment and non-farm enterprise, we categorized these economic activities into 17 industries based on the International Standard for Industrial Classification (ISIC) and analyzed the gender differences.

In both countries, there are significant gender gaps in access to salaried employment in RNFE. Only 7 and 17 percent of female-headed households had salaried off-farm employment in Ethiopia and Uganda, respectively. These figures are lower than male-headed households by 2 and 5.7 percentage points, respectively (Table 1).^{12,13} The analysis of employment by industry (as per the ISIC) reveals that there are notable differences, especially in Uganda. Female-headed households have lesser access to employment in construction, transportation and communications, fishery, public admin, and ‘other social services’ sectors of Uganda than their male-headed counterparts. In Ethiopia, a smaller proportion of female-head households had salaried employment in agriculture and ‘other social services’ sectors. However, a higher percentage of female-headed households are employed in health and social work in both countries, and hotel and restaurant services in Uganda.

Similarly, a smaller proportion of female-headed households in Ethiopia (19.8%) and Uganda (33.5 %) owned a non-farm enterprise, which is lower compared to male-headed households respectively by 6 and 8 percentage points (Table 1). Based on the ISIC, a higher proportion of male-headed households own enterprises that operate in mining and quarrying, construction, ‘other social services’, and electricity, gas and water industries

¹²In Table 1, we present the proportion of households that have access to employment in each industry. Therefore, the sum of the proportion in each industry should be roughly equal to employment in all industries.

¹³For Ethiopia, we have additional information on employment as casual laborer and under the Productive Safety Net Project (PSNP). Only 18 percent of female-headed households had access employment as casual laborer. This is lower than that of male-headed households by 8 percentage points. However, there is no gender-based difference in employment under the PSNP. About 9 percent of both female- and male-headed households are employed under the PSNP.

in Ethiopia. Similarly, male-headed households have advantage in the fishery, sales, maintenance and repair, transport and communications, and unclassified industries in Uganda. Whereas, female-headed households tend to participate more in the hotel and restaurant industry in both countries, and the agriculture and manufacturing sector in Uganda.

For Ethiopia, we have an additional broader classification of non-farm enterprises into seven groups: those in non-agricultural business, processing agricultural output, trading business, services/sales, professional services, trade/moving services, and hotel, bar or restaurants. Based on this classification, female-headed households have limited access to non-agricultural business. Their enterprises seem to be mostly engaged in processing of agricultural outputs. On the other hand, a large proportion of enterprises operated by male-headed households engage in non-agricultural businesses (Table A.5 in the Annex).

Table 1: Gender differences in access to salaried employment and ownership of non-farm enterprise by industry

	Salaried employment				Non-farm enterprise			
	Ethiopia		Uganda		Ethiopia		Uganda	
	Female	Difference	Female	Difference	Female	Difference	Female	Difference
All industries (% of households)	7.0 (0.6)	-2.0** (0.8)	16.9 (0.9)	-5.7*** (1.2)	19.8 (0.9)	-3.9*** (1.2)	33.5 (1.2)	-7.6*** (1.4)
ISIC:								
Agriculture	0.9 (0.2)	-1.1** (0.4)	4.3 (0.5)	0.6 (0.6)	0.6 (0.2)	-0.2 (0.3)	1.5 (0.3)	1.0*** (0.3)
Fishery	0.0 (0.0)	-0.0 (0.0)	0.0 (0.0)	-0.4* (0.2)	0.2 (0.1)	-0.1 (0.1)	0.0 (0.0)	-0.3* (0.1)
Mining & quarrying	0.1 (0.1)	0.1 (0.1)	0.0 (0.0)	-0.1 (0.1)	0.1 (0.1)	-0.7** (0.2)	0.2 (0.1)	0.1 (0.1)
Manufacturing	0.1 (0.1)	-0.3 (0.2)	0.8 (0.2)	-0.9** (0.4)	5.1 (0.5)	0.8 (0.6)	3.8 (0.5)	1.0* (0.5)
Electricity, gas & water	0.1 (0.1)	-0.1 (0.1)	0.0 (0.0)	-0.1 (0.1)	3.5 (0.4)	-1.5* (0.6)	0.0 (0.0)	-0.1 (0.1)
Construction	0.7 (0.2)	-0.6 (0.3)	0.4 (0.2)	-2.5*** (0.4)	0.3 (0.1)	-0.4* (0.2)	0.0 (0.0)	-0.1 (0.1)
Sales, maintenance & repair	0.1 (0.1)	-0.1 (0.1)	1.2 (0.3)	-0.1 (0.3)	5.7 (0.5)	-1.2 (0.7)	6.1 (0.6)	-2.4** (0.8)
Hotel & Restaurant	0.2 (0.1)	0.1 (0.1)	1.0 (0.2)	0.6** (0.2)	0.8 (0.2)	0.5** (0.2)	0.7 (0.2)	0.5** (0.2)
Transport & communications	0.3 (0.1)	0.0 (0.1)	0.2 (0.1)	-2.3*** (0.4)	3.3 (0.4)	-0.7 (0.5)	0.6 (0.2)	-0.8* (0.3)
Financial intermediation	0.0 (0.0)	-0.1 (0.1)	0.2 (0.1)	0.2** (0.1)	0.1 (0.1)	0.1 (0.0)	0.0 (0.0)	-0.1 (0.1)
Real estate, renting & business	0.0 (0.0)	-0.0 (0.1)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	-0.0 (0.0)	0.3 (0.1)	-0.1 (0.2)
Public admin & defense	0.5 (0.2)	-0.2 (0.2)	0.8 (0.2)	-0.7* (0.3)	0.0 (0.0)	-0.0 (0.0)	0.4 (0.1)	0.2 (0.1)
Education	1.3 (0.3)	0.2 (0.3)	3.8 (0.5)	0.3 (0.6)	0.0 (0.0)	-0.0 (0.0)	0.1 (0.1)	0.0 (0.1)
Health & social work	1.3 (0.3)	0.9*** (0.2)	1.8 (0.3)	0.9** (0.3)	0.0 (0.0)	-0.0 (0.1)	0.1 (0.1)	-0.3 (0.2)
Other social services	0.5 (0.2)	-0.5* (0.3)	1.4 (0.3)	-1.5** (0.5)	0.0 (0.0)	-0.3* (0.2)	0.4 (0.2)	-0.2 (0.2)
Private with employed person	0.3 (0.1)	-0.1 (0.2)	0.6 (0.2)	0.3 (0.2)	0.1 (0.1)	0.1 (0.1)	0.0 (0.0)	-0.0 (0.0)
Extra-territorial org & bodies	0.1 (0.1)	-0.2 (0.2)	0.3 (0.1)	0.2 (0.1)				
Not classified							20.9 (1.0)	-6.4*** (1.3)
N	1,986	7,745	1,609	5,443	1,978	7,685	1,610	5,275

Note: 'Difference' refers to mean value for female-headed households minus that of male-headed households.

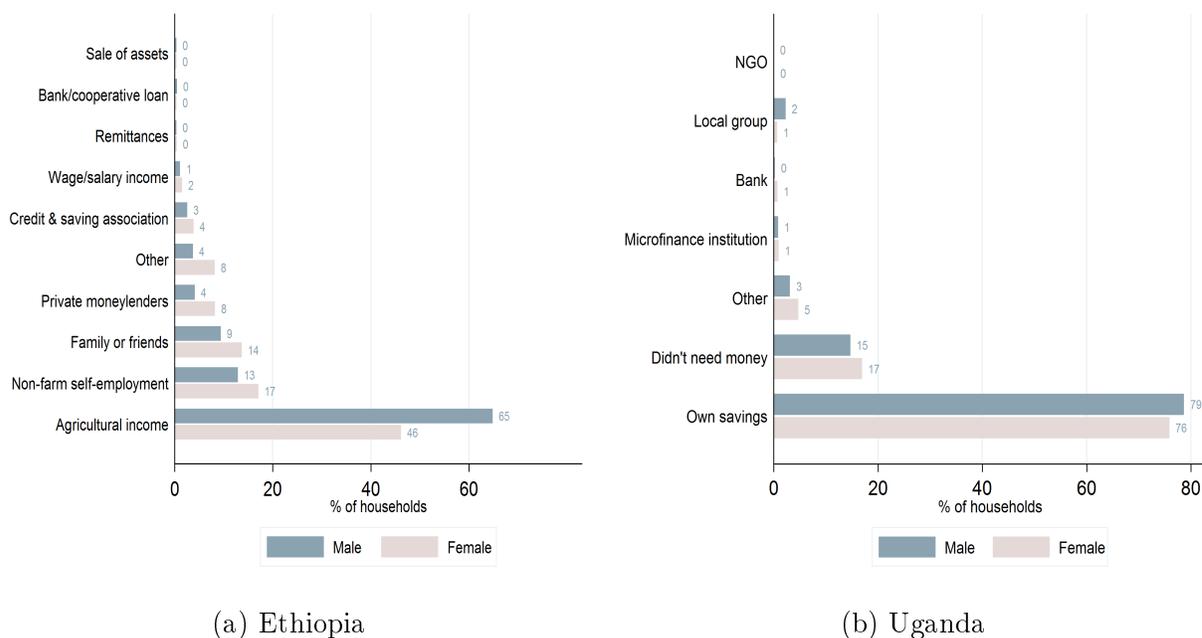
For Uganda, only 831 out of the 2,237 the non-farm enterprises have been classified according to the ISIC.

In addition, we explore the difference between female- and male-headed households in terms of the location of their non-farm enterprises and the sources of start-up capital for these enterprises. The majority of non-farm enterprises owned by female-headed

households are operated in or around their residence. This is especially true in Ethiopia, where 44 percent of these enterprises operate inside the residence and another 8 percent of them operate near/outside the residence (Figure A.2, in the Annex). On the other hand, enterprises owned by male-headed households predominantly operate in markets (35%), followed by inside residence (27%) and with no fixed location/mobile (12%). In Uganda, there is a substantial heterogeneity in the locations of female owned non-farm enterprises: only 20 and 19 percent of the enterprises operate inside and near residence, respectively. Construction sites (20%) and traditional markets (19%) are also common places of operation for these enterprises. The gender difference in enterprise location is less pronounced in Uganda.

We also explored the gender-based differences in the sources of start-up capital for non-farm enterprises. In both Uganda and Ethiopia, own resources—savings, agricultural income and/or return from labor—were the main contributors of start-up capital for both male- and female-headed households. In Ethiopia, agricultural income contributes 65 and 46 percent of the start-up capital for male-headed and female-headed households, respectively. It seems that female-headed households have better diversified capital sources: they acquired resources from non-farm self-employment (17%), family/friends (14%) and private moneylender (8%). In Uganda, own resource/savings is also the main source of start-up capital for both female- and male-owned enterprises.

Figure 1: The major source of start-up capital for non-farm enterprise is own savings or agricultural income



3. Empirical Strategy

This section outlines the empirical approaches adopted to address the four inter-related issues presented above. To study the patterns of participation in RNFE among female- and male-headed households, and the determinants of access to RNFE, we use a combination of descriptive analysis, t-tests for mean differences, and probability model. We implement t-tests to compare mean value of participation in different types of non-farm activities and return from RNFE among male- and female-headed households as well as differences in endowments that could potentially explain the gender gap in RNFE. Then, we estimate a logit model for participation in RNFE (P_{it})—defined as engaging in any off-farm activity through employment or self-employment—on a gender

dummy and other covariates as follows:

$$P_{it} = \alpha * Gender_i + X'_{it}\beta + \mu_{it} \quad (1)$$

...where X_{it} is a vector of covariates such as human and physical capital, and household i 's exposure to shocks, community specific factors such as access to infrastructure and markets, and climatic conditions. $Gender_i$ is a dummy for female-headed household, and μ_{it} is the error term. Estimation results from this equation would be used to study the gender gap in access to RNFE, after accounting for other potential determinants of participation. In addition, the estimation would help us in identifying the important variables that might influence households' participation in RNFE.

We implement Blinder-Oaxaca decomposition to assess whether female-headed households face a different return structure relative to their male-headed counterparts in RNFE. Blinder-Oaxaca decomposition (Blinder, 1973; Oaxaca, 1973) enables us to separate the difference in return between female- and male-headed households into two: one that is explained by groups' differences in endowments of productive assets, and a residual part which is not explained by endowments differences, as in a counterfactual manner.

For households participating in RNFE, household i 's return from off-farm activities can be represented as:

$$Y_{it} = X'_{it}\beta + \epsilon_{it} \quad (2)$$

...where Y_{it} is (log) off-farm income per capita for household i ; X_{it} is a vector of regressors (household- and community-specific characteristics, exposure to shocks, and climatic conditions); and ϵ_{it} is random error. For the two groups of households (male-headed, m , and female-headed, f), we can write: $Y_{it}^j = X_{it}^{j'}\beta^j + \epsilon_{it}^j$, where the superscript indicates the gender of household i 's head.

For these two groups, the average difference in off-farm return, $D = E(Y_{it}^f) - E(Y_{it}^m)$, can be decomposed into three components:

$$D = [(E(X_{it}^f) - E(X_{it}^m))' \beta^m] + [E(X_{it}^m)'(\beta^f - \beta^m)] + [(E(X_{it}^f) - E(X_{it}^m))'(\beta^f - \beta^m)] \quad (3)$$

The first component, $[E(X_{it}^f) - E(X_{it}^m)]' \beta^m$, represents return-differential attributable to differences in endowments. The second component, $E(X_{it}^m)'(\beta^f - \beta^m)$, reflects return gap due to differences in marginal returns to these endowments. And the final component, $[E(X_{it}^f) - E(X_{it}^m)]'(\beta^f - \beta^m)$, reflects the interaction of gaps in endowments and marginal returns to these endowments (see [Blinder \(1973\)](#) and [Oaxaca \(1973\)](#))

Equation (3) compares female-headed households' return against that of male-headed households. In effect, male-headed households' vector of coefficients is taken as a reference vector of marginal returns. Alternatively, a 'neutral' vector of coefficients, β^* , could be used (in place of β^m) to attribute the return gap to gender-based discrimination.¹⁴ We can then decompose the return gap into two components: the part that is '*explained*' by endowment differences, $[E(X_{it}^f) - E(X_{it}^m)]' \beta^*$, and the part that is '*unexplained*', $E(X_{it}^f)'(\beta^f - \beta^*) + E(X_{it}^m)'(\beta^* - \beta^m)$:

$$D = [(E(X_{it}^f) - E(X_{it}^m))' \beta^*] + [E(X_{it}^f)'(\beta^f - \beta^*) + E(X_{it}^m)'(\beta^* - \beta^m)] \quad (4)$$

The part that is not explained by endowment difference could be considered as a result of discrimination against women in RNFE (see [Jann \(2008\)](#)). This, however, assumes that there are no omitted variables that could explain the return gap. In reality, there are observable and unobservable variables that are potentially omitted from the model. Therefore, the unexplained return gap could be the result of discrimination and/or omitted variables.

¹⁴There are a number of approaches for constructing the neutral coefficient, β^* . We adopt a simple average of marginal returns for male- and female-headed households ([Reimers, 1983](#); [CI Jann, 2008](#))

The above decomposition is based only on those households that are participating in RNFE. Therefore, we need to correct for selection (into RNFE) bias (see Heckman (1976) and Heckman (1979)). In the presence of selection bias, the error term (ϵ_{it}) in the return equation above— $Y_{it} = X'_{it}\beta + \epsilon_{it}$ —will have a non-zero conditional mean, i.e. $E(\epsilon_{it}|X_{it}, Y_{it} > 0) \neq 0$. It has been extensively documented that access to opportunities to diversify, especially into more lucrative activities in RNFE, does not seem to be evenly distributed. There are significant entry barriers into RNFE (Reardon, 1997); well-off household have disproportional access to RNFE (Woldehanna and Oskam, 2001; Reardon, 1997); geographically isolated households might not take full advantage of RNFE (Lanjouw et al., 2001) or might be forced to diversify more to satisfy own demand for diverse consumption (Omamo, 1998: cited in Barrett et al., 2001).

Therefore, Blinder-Oxaca decomposition with Heckman correction is employed to address the selection bias. This involves a two-step procedure, and the correction procedure needs to satisfy the exclusion restriction—i.e. at least one variable that drives participation, but not return, is identified—if it were not to rely on a very strong assumption, specifically the joint normality of the error terms in the selection and return equations. In this study, we argue that households' ownership of agricultural resources such as land and livestock is inversely correlated with their participation in off-farm activities, but it is unlikely to influence return from non-farm activities. Households that own more farmland compared to the number of adult members who are able to work are more likely focus on agriculture. Similarly, ownership of oxen, an important farm input, could encourage households to devote their time to farming. However, the ownership of pack animals such as horses and donkeys is deliberately excluded as one might argue that those who own pack animals are more likely to be productive in some non-farm activities such as trade and provision of shipping services. There are potentially contradictory arguments as to why ownership of agricultural resources might also influence non-farm returns, in addition to participation in the sector. First, due to the physical effort requirements, households that own more farm resources and

hence engaged in agriculture are not only less likely to engage in off-farm activities but also earn lower return from these activities. This argument, however, is not quite valid in context of Ethiopia and Uganda where agriculture is rainfed and its labor requirements are very seasonal. On the contrary, others might argue that households with more agricultural resources generally earn high non-farm return due to inherent ability. This might be true in a context where the non-farm sector is skill intensive and requires sophisticated know-how. However, rural non-farm activities tend to be low skilled employment and/or operation of labor intensive non-farm enterprises.

4. Results

4.1. Determinants of Participation

We have descriptively shown above that female-headed households have limited access to RNFE. In addition to gender, a number factors could be contributing to low participation. To study whether female-headed households' participation probability is still lower after accounting for other determinants, we estimate a logit model and the results are presented in Table 2. The dependent variable is a participation dummy, which is equal to one if the household engages in any off-farm activity and zero otherwise. For the purpose of analysis, the sample is divided into rural areas and rural⁺ areas, which includes households in rural areas and small towns in Ethiopia and households in rural areas and other urban centers excluding Kampala in Uganda.

After controlling for other factors, the gender of the household head seems not to influence the probability of participation in RNFE of Ethiopia. Whereas, in Uganda, female-headed households continue to have lower probability of participating in the sector even after accounting for other factors. Some characteristics such as household head's education level, household size, dependency ratio, asset ownership, and frequency of shocks stand out as major determinants of participation. In both

countries, households with more educated heads are more likely to participate in RNFE. This evidence is consistent with the argument that economic activities in the non-agricultural sector tend to require specialized skills. On the other hand, households with a high dependency ratio and very old heads are less likely to participate in RNFE.

In Ethiopia, large household size and frequent exposure to shocks are positively associated with participation, but households that own livestock are less likely to engage in off-farm activities. This could be an indication that push factors—shocks and limited agricultural resources—play a significant role in encouraging households to diversify outside agriculture. Distance from roads and market also matter. In Ethiopia, households that are located farther from roads tend to participate less in RNFE. Residing far from a market also decreases participation probability in Uganda, but seems to increase participation in Ethiopia.

Table 2: Determinant of households' participation in RNFE

	Ethiopia		Uganda	
	Rural +	Rural	Rural +	Rural
Head's gender (female)	-0.02 (0.0)	-0.03 (0.0)	-0.13*** (0.0)	-0.11*** (0.0)
Head's age	0.01** (0.0)	0.00 (0.0)	0.01 (0.0)	0.00 (0.0)
Head's age squared	-0.00*** (0.0)	-0.00** (0.0)	-0.00*** (0.0)	-0.00** (0.0)
Head completed primary edu	0.16*** (0.0)	0.13*** (0.0)	0.06** (0.0)	0.04 (0.0)
Head completed secondary edu	0.14*** (0.0)	0.10** (0.0)	0.09*** (0.0)	0.15*** (0.0)
Household size	0.04*** (0.0)	0.03*** (0.0)	0.01* (0.0)	0.01 (0.0)
Dependency ratio	-0.00*** (0.0)	-0.00*** (0.0)	-0.27*** (0.1)	-0.25*** (0.1)
Does the HH own cattle?	-0.17*** (0.0)	-0.11*** (0.0)	-0.06** (0.0)	-0.05 (0.0)
Number of cattle owned	-0.01** (0.0)	-0.01** (0.0)	0.00 (0.0)	0.00 (0.0)
Poultry ownership (number)			0.00 (0.0)	0.00 (0.0)
Usufruct/ownership right over farmland	-0.15*** (0.0)	-0.06* (0.0)	-0.04 (0.0)	-0.02* (0.0)
Landholding (hectare/adult)	-0.01 (0.0)	-0.01 (0.0)	0.00 (0.0)	0.00 (0.0)
Experienced natural shocks	-0.06** (0.0)	-0.02 (0.0)	-0.02 (0.0)	-0.00 (0.0)
Experienced health shocks	0.01 (0.0)	0.01 (0.0)	0.04 (0.0)	0.07 (0.0)
Members sick with malaria	-0.03** (0.0)	-0.02* (0.0)		
Frequency of 3 major shocks	0.01** (0.0)	0.01** (0.0)		
Distance from road (km)	-0.00 (0.0)	0.00* (0.0)	-0.00 (0.0)	-0.00 (0.0)
Distance from market (km)	0.00* (0.0)	0.00 (0.0)	-0.00** (0.0)	-0.00* (0.0)
Distance from boarder(km)	0.00*** (0.0)	0.00** (0.0)	-0.00 (0.0)	0.00 (0.0)
N	7,534	6,627	4,741	3,949

Note: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is participation dummy. The coefficients presented above are marginal effects.

We also control for climatic conditions (precipitation during the wettest season and mean annual temperature) and topography. In addition, for Ethiopia, we have included zone FEs in all of the regressions. For Uganda, we have also included region and rural-urban FEs.

As noted above, women become household heads under different circumstances, and male spouses typically tend to be the household heads whenever they are present in the households. Here, we analyze the heterogeneity in participation gap across

heads with different marital statuses. Table 3 presents the heterogeneous participation probability differences between male- and female-headed households with different marital status.¹⁵ In Ethiopia, there is no statistically significant difference in the gender gap in participation by marital status of the female-head. It should also be noted that, as shown in Table 2, there is no overall difference in participation between male-and female-headed households. On the other hand, married female heads in Uganda have less participation than married male household heads. It should be noted that 42 percent of the male spouses of female-headed households are migrants. However, there is no difference in participation between never married, divorced or widow/widower male- and female-heads.

Table 3: Heterogeneity in participation by marital status of the head

	Ethiopia		Uganda	
	Rural +	Rural	Rural +	Rural
Female x Married	-0.05 (0.04)	-0.05 (0.04)	-0.12*** (0.04)	-0.10** (0.04)
Female x Never married	0.06 (0.11)	0.06 (0.13)	0.12 (0.18)	0.19 (0.21)
Female x Divorced/Separated	0.02 (0.09)	-0.04 (0.08)	0.02 (0.09)	0.01 (0.10)
Female x Widow	-0.04 (0.10)	0.01 (0.11)	-0.10 (0.12)	-0.13 (0.11)
N	7,534	6,627	4,741	3,949

Note: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

The results presented in Table 2 show determinants of participation in RNFE for both male- and female-headed households. In order to identify the factors that are strongly associated with female participation in RNFE, each variable in equation 1 is

¹⁵The results presented in Table 3 are based on re-estimation of Equation 1 by introducing additional interaction between gender dummy with marital status of the head as follows:

$$P_{it} = \alpha_1 Female * NeverMarried_i + \alpha_2 Female * Married_i + \alpha_3 Female * Divorced_i + \alpha_4 Female * Widow_i + X'_{it} \beta + \mu_{it}$$

Where, the vector X_{it} includes, in addition to the covariates included in main estimation results presented in Table 2, four dummies corresponding to marital status of the household head. We also excluded the constant term to allow the coefficients α_1 - α_4 to represent comparison between female and male heads with corresponding marital status.

interacted with a dummy for female household head.¹⁶ The results show that households headed by females with primary or secondary education are more likely to engage in RNFE both in Uganda and Ethiopia. While, households headed by older females tend to engage less in RNFE. High dependency ratio decreases participation in RNFE, more strongly in Uganda. Female-headed households that own sufficient agricultural resources appear to engage more in agriculture instead of RNFE (Table A.6).

4.2. Return Gap

In this section, we present the results from the Blinder-Oaxaca decomposition of return. As noted in the introduction, households self-select into the non-farm sector. Therefore, return gap analysis among households that are in the sector would be biased if such selection bias is not addressed. Accordingly, in all the decomposition results presented in Table 4, we apply Heckman’s correction for selection biases. This typically involves a two-step procedure where a selection equation is estimated first, and return decomposition is conducted after accounting for selection probabilities estimated in the first stage. The correction procedure needs to satisfy an exclusion restriction—i.e. at least one variable that drives participation, but not return, is identified—if it were not to rely on a very strong assumption, specifically the joint normality of the error terms in the selection and return equations. In this study, we argue that households’ ownership of agricultural resources such as land and livestock is inversely correlated with their participation in off-farm activities. Households that possess such resources typically engage in agriculture, and this somehow limits their engagement in off-farm activities (Table 3). However, possession of such resources is unlikely to influence return from non-farm activities.

In the return analysis, we control for the following covariates: household character-

¹⁶In other words, we estimate the following equation: $P_{it} = \alpha + [Female * X_{it}]' \beta + \mu_{it}$...where X_{it} is the same covariates as in equation 1, and *Female* is a dummy equal to one if the household head is female and zero otherwise.

istics, shocks, community characteristics, climate, and zone FEs in Ethiopia (region-urban/rural FEs in Uganda). *Household characteristics* include household head’s age and age squared, head’s education, household size, and dependency ratio. *Shocks* include exposure to natural shocks such as drought, landslide etc., and health shocks as well as frequency of the three major shocks households have faced in the past year. *Community characteristics* include distances from market, roads and national borders. *Climate* refers to precipitation during the wettest season, mean annual temperature, and topography. In addition to these variables, the selection equation includes ownership and amount of agricultural resources: dummy for usufruct/ownership right over farmland and the per adult size landholding, dummy for ownership of livestock and number of livestock owned, and dummy for poultry ownership.

After accounting for selection bias, we conduct analysis of the return gap between female- and male-headed households that are participating in RNFE.¹⁷ The return decomposition results reveal that female-headed households in both countries are placed at a relative disadvantage. The results are presented in Table 4, which includes four sets of decomposition for each country. In both countries, under all of the four alternative sets of decomposition, female-headed households earned significantly less from engaging in RNFE. In Ethiopia, for instance, female-headed households earned 29 percent less in gross non-farm return than male-headed households. This return gap, accompanied by similar levels of return gap in farming (see Aguilar et al. (2015)), would have huge adverse welfare effects on female-headed households. The net-return gap is even greater: 37 and 40 percent in rural⁺ areas and rural areas of Ethiopia, respectively.

Similarly, the gross return gaps are as high as 61 percent in Uganda. In terms of net-return, the gender gaps in rural⁺ areas and rural areas of Uganda are 56 and 60 percent, respectively.¹⁸

¹⁷We consider two measures of returns: gross and net return.

¹⁸These kinds of return gaps between women and men are not unique to non-farm sectors of Ethiopia and Uganda. As documented in Hertz et al. (2009), the gender gap in both non-agricultural and

Female-headed households in rural areas are at a much greater disadvantage, compared to those in rural⁺ areas. For instance, in Ethiopia, the net return gap in rural areas is 38 percent, which is 3 percentage points higher than the gap in rural⁺ areas. The net return gap in rural areas is also high in Uganda: 60 percent, which is higher by 4 percentage points compared to the gender gap in rural⁺ areas.

The return gaps are further decomposed into two: (1) the part that is explained by differences in endowments; and (2) the portion that is not explained by endowment differences and hence could be the result of gender bias and/or omitted variables. In Ethiopia, the major portion of the gender gap in return is not explained by differences in endowments of physical and human capital, exposure to shocks and access to infrastructure. In fact, all of the differences in return between female- and male-headed households seem to be unexplained by endowment, and could be the result of discrimination against female. The result is similar in both rural areas and rural⁺ areas. In Uganda, we find that part of the gender gap is explained by the endowment difference both in rural and rural⁺ areas. The large proportion of the gender gap remains unexplained by endowment difference in Uganda as well—reflecting a potential gender based discrimination in the RNFE. The finding that a good portion of the return gap remains unexplained by endowment differences is indicative of discrimination against women entrepreneurs and employees in the sector. Of course, unobserved factors such as innate ability could also be responsible for the return gap (Table 4).

agricultural sectors is estimated at comparable magnitude in 16 selected developing countries and transition economies.

Table 4: Decomposition of return from RNFE

	Rural+		Rural only	
	Gross	Net	Gross	Net
Ethiopia				
Prediction for Female	6.69*** (0.04)	6.46*** (0.04)	6.44*** (0.05)	6.26*** (0.05)
Prediction for Male	7.04*** (0.07)	6.92*** (0.07)	6.78*** (0.11)	6.77*** (0.09)
Difference	-0.34*** (0.09)	-0.46*** (0.08)	-0.35** (0.12)	-0.51*** (0.10)
Explained	-0.05 (0.05)	0.00 (0.04)	-0.01 (0.05)	0.03 (0.05)
Unexplained	-0.29*** (0.08)	-0.46*** (0.08)	-0.33** (0.11)	-0.55*** (0.10)
<i>N</i>	3,296	3,277	2,723	2,708
Uganda				
Prediction for Female	11.92*** (0.05)	11.79*** (0.05)	11.64*** (0.05)	11.53*** (0.05)
Prediction for Male	12.85*** (0.11)	12.63*** (0.09)	12.69*** (0.11)	12.45*** (0.10)
Difference	-0.93*** (0.12)	-0.83*** (0.10)	-1.06*** (0.12)	-0.92*** (0.12)
Explained	-0.34*** (0.04)	-0.30*** (0.04)	-0.35*** (0.04)	-0.31*** (0.04)
Unexplained	-0.59*** (0.12)	-0.53*** (0.10)	-0.71*** (0.12)	-0.61*** (0.11)
<i>N</i>	3,832	3,774	3,086	3,048

Note: Cluster robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. The standard errors are clustered at zone level in Ethiopia and region-urban/rural level in Uganda.

Rural+ includes small towns. Return is in per capita terms, log(ETB) or log(US\$).

To convert the logarithmic difference (β) into percentage difference, we use $(e^\beta - 1) * 100$ as an approximation. In Ethiopia, the gross return gaps in rural+ areas and rural areas are 29 and 30 percent, respectively. In Uganda, the corresponding return gaps are 61 and 65 percent. In terms of net-return, the gender gaps in rural+ areas (& rural areas) in Ethiopia and Uganda are 37 (& 40) and 56 (& 60) percent, respectively.

Heterogeneity by marital status: There are substantial heterogeneities in return gap between female- and male-headed households with different marital status, especially in Uganda. Widow household heads in Uganda earn substantially less than widower heads. Similarly, divorced and married female-heads earn less than male-heads with the corresponding marital status. Whereas, households with never married female heads

have lower return than those with never married male heads.

In Ethiopia, households headed by married females earned less than those head by married males. In rural Ethiopia, divorced female heads have had a lower gross return than divorced male heads. However, there is no statistically significant gender gap between widows/widowers and never married household heads.

Table 5: Heterogeneity in (log) return gap marital status of female heads

Ethiopia				
	Rural+		Rural only	
	Gross	Net	Gross	Net
Married	-0.25** (0.08)	-0.24** (0.07)	-0.24** (0.08)	-0.22** (0.08)
Never married	-0.11 (0.20)	-0.09 (0.19)	-0.51 (0.26)	-0.23 (0.25)
Divorced/Separated	-0.33 (0.17)	-0.10 (0.16)	-0.42* (0.19)	-0.22 (0.18)
Widow	-0.05 (0.17)	-0.01 (0.16)	-0.04 (0.19)	-0.09 (0.18)
<i>N</i>	3296	3277	2723	2708
Uganda				
	Rural+		Rural only	
	Gross	Net	Gross	Net
Married	-0.33** (0.10)	-0.21* (0.10)	-0.58*** (0.13)	-0.43*** (0.12)
Never married	0.79* (0.32)	0.76* (0.31)	1.64*** (0.38)	1.61*** (0.37)
Divorced/Separated	-0.08 (0.13)	-0.05 (0.12)	-0.49** (0.16)	-0.41** (0.15)
Widow	-1.17*** (0.15)	-1.07*** (0.14)	-1.83*** (0.21)	-1.69*** (0.20)
<i>N</i>	3832	3774	3086	3048

5. Conclusion

A number of previous studies have shown that RNFE offers a decent alternative income source and improves well-being. The extent of women's engagement in and

their returns from RNFE is not clearly documented, and previous studies seem to offer contrasting accounts. This study investigates the relative position of female-headed households in accessing employment/self-employment in RNFE and the amount of earnings.

We find that returns from RNFE account for a fairly high share of household income, especially in Uganda where about 50 percent of gross household income originates from off-farm activities. In Ethiopia, only 28 percent of gross household income is from off-farm activities. There are also significant gender gaps in access to salaried employment and self-employment in RNFE. For instance, only 7 percent of female-headed households in Ethiopia had salaried off-farm employment and 20 percent of them owned a non-farm enterprise, compared respectively to 9 percent and 24 percent of male-headed households. Analysis of industry of employment and self-employment shows that, in both countries, female-headed households have less access to potentially more rewarding industries such as manufacturing, and transport and communications. In addition, enterprises owned by female-headed households typically operate near/inside the residence, and engage in processing of agricultural outputs instead of non-agricultural businesses. These enterprises were also typically established using own resources as a start-up capital.

Results from the return analysis reveal that female-headed households benefit less from engagement in RNFE. Female-headed households in Ethiopia and Uganda earned less gross return than male-headed households. In addition, the major portion of the gender gap in return remains unexplained by differences in endowments, especially in Ethiopia.

Four direct policy implications are drawn based on the findings from this research: (1) The analysis presented in this paper shows that there are noticeable gender gaps in access to some industries. These access gaps are likely to translate into return gaps,

especially when females do not manage to engage in industries with high return and substantial entry barriers. Policy makers need to adopt policies that facilitate females' participation in industries that have high returns such as construction, transport and mining, but where socio-cultural factors limit female participation. For instance, female employees could be selectively targeted in public infrastructure investments such as road construction within their communities. Due to common social practices and cultural role assignments such as increased responsibilities bestowed upon women to care for children and elderly, encouraging female participation in national road projects might however be challenging. (2) Education is identified as one of the major drivers of participation in non-farm employment and self-employment. Policy measures that address the skill shortage among females could improve their chance of accessing the RNFE. Even short-term training to improve employability and business skills could help alleviate the skills and know-how challenges facing female-headed households. (3) Non-farm enterprise owners, both female and male, reported that they rely extensively on personal savings/incomes to start their enterprises. Only a handful of enterprise owners (less than 5%) were able to access loan from formal financial sources such as credit/savings associations, micro-finance or banks to start their business. Policies that improve access to finance could help level the playing field for poor female-headed households that have limited personal resources to start a lucrative non-farm enterprise that would require large initial capital. (4) Return analysis shows that female-headed households earn less, and endowment gaps explain only part of the return gaps. Policy measures that address gaps in human and financial capital (outlined in points 2 & 3 above) could address some of the endowment gaps, and hence reduce the return differential. However, most of the return gaps remain unexplained, and hence policy makers would also need to address gender based discrimination in the non-farm sector to reduce the gender gap in return.

References

- Aguilar, A., Carranza, E., Goldstein, M., Kilic, T., Oseni, G., 2015. Decomposition of gender differentials in agricultural productivity in Ethiopia. *Agriculture Economics* 46 (3), 311–334.
- Barrett, C. B., Reardon, T., Webb, P., 2001. Nonfarm income diversification and household livelihood strategies in rural Africa: concepts, dynamics, and policy implications. *Food Policy* 26 (4), 315–331.
- Bezu, S., Barrett, C. B., Holden, S. T., 2012. Does the nonfarm economy offer pathways for upward mobility? Evidence from a panel data study in Ethiopia. *World Development* 40 (8), 1634–1646.
- Blinder, A. S., 1973. Wage discrimination: Reduced form and structural estimates. *Journal of Human Resources* 8 (4), 436–455.
- Block, S., Webb, P., 2001. The dynamics of livelihood diversification in post-famine Ethiopia. *Food Policy* 26 (4), 333–350.
- Canagarajah, S., Newman, C., Bhattamishra, R., 2001. Non-farm income, gender, and inequality: evidence from rural Ghana and Uganda. *Food Policy* 26 (4), 405–420.
- Davis, B., Winters, P., Carletto, G., Covarrubias, K., Quiñones, E. J., Zezza, A., Stamoulis, K., Azzarri, C., DiGiuseppe, S., 2010. A cross-country comparison of rural income generating activities. *World Development* 38 (1), 48–63.
- Djurfeldt, A. A., Djurfeldt, G., Bergman Lodin, J., 2013. Geography of gender gaps: Regional patterns of income and farm–nonfarm interaction among male- and female-headed households in eight African countries. *World Development* 48, 32–47.
- Haggblade, S., Hazell, P., Reardon, T., 2010. The rural non-farm economy: Prospects for growth and poverty reduction. *World Development* 38 (10), 1429–1441.

- Heckman, J., 1979. Sample selection bias as a specification error. *Econometrica* 47 (1), 129–137.
- Heckman, J. J., 1976. The common structure of statistical models of truncation, sample selection and limited dependent variables and a simple estimator for such models 5 (4).
- Hertz, T., Azzarri, C., Winters, P., Quiñones, E. J., Davis, B., 2009. Wage inequality in international perspective: Effects of location, sector, and gender.
- Jann, B., 2008. The blinder–oaxaca decomposition for linear regression models. *Stata Journal* 8 (4), 453–479.
- Lan, P., 2007. Does the rural nonfarm economy contribute to poverty reduction? In: *Transforming the Rural Nonfarm Economy: Opportunities and Threats in the Developing World*. The Johns Hopkins University Press.
- Lanjouw, P., Quizon, J., Sparrow, R., 2001. Non-agricultural earnings in peri-urban areas of Tanzania: evidence from household survey data. *Food Policy* 26 (4), 385–403.
- Oaxaca, R., 1973. Male-female wage differentials in urban labor markets. *International Economic Review* 14 (3), 693–709.
- Reardon, T., 1997. Using evidence of household income diversification to inform study of the rural nonfarm labor market in Africa. *World Development* 25 (5), 735–747.
- Reardon, T., Delgado, C., Matlon, P., 1992. Determinants and effects of income diversification amongst farm households in Burkina Faso. *Journal of Development Studies* 28 (2), 264–296.
- Rigg, J., 2006. Land, farming, livelihoods, and poverty: Rethinking the links in the rural south. *World Development* 34 (1), 180–202.

- Sarah, S., Ibrahim, K., 2012. Poverty and inequality dynamics in Uganda: Insights from the Uganda national panel surveys 2005/6 and 2009/10.
- Smith, D. R., Gordon, A., Meadows, K., Zwick, K., 2001. Livelihood diversification in Uganda: Patterns and determinants of change across two rural districts. *Food Policy* 26 (4), 421–435.
- Webb, P., Reardon, T., 1992. Drought impact and household response in east and west Africa. *Quarterly Journal of International Agriculture* 31 (3), 230–246.
- Woldehanna, T., Oskam, A., 2001. Income diversification and entry barriers: evidence from the Tigray region of Northern Ethiopia. *Food Policy* 26 (4), 351–365.
- World Bank, W., 2007. *Development Development Report 2008: Agriculture for Development*.

A. Annex

Table A.1: Endowments difference between female- and male-headed households

	Ethiopia			Uganda		
	<i>Gender</i>		Difference	<i>Gender</i>		Difference
	Female	Male		Female	Male	
Head's age	48.7 (0.4)	44.2 (0.2)	-4.5*** (0.8)	47.8 (0.4)	41.5 (0.2)	-6.3*** (0.5)
Head completed primary edu	0.1 (0.0)	0.3 (0.0)	-0.2*** (0.0)	0.3 (0.0)	0.5 (0.0)	0.2*** (0.0)
Head completed secondary edu	0.1 (0.0)	0.2 (0.0)	0.1*** (0.0)	0.1 (0.0)	0.3 (0.0)	0.1*** (0.0)
Household size	4.0 (0.0)	5.9 (0.0)	1.9*** (0.1)	5.5 (0.1)	6.5 (0.1)	1.0*** (0.1)
Dependence ratio	1.9 (0.1)	1.3 (0.1)	-0.6*** (0.0)	0.5 (0.0)	0.5 (0.0)	-0.1*** (0.0)
Landholding (hectare)	0.9 (0.0)	1.5 (0.1)	0.6*** (0.1)	2.7 (0.4)	4.1 (0.4)	1.4* (0.6)
Cattle ownership	2.6 (0.1)	3.9 (0.1)	1.3*** (0.2)	1.1 (0.1)	1.8 (0.2)	0.7** (0.3)
Natural shocks	0.2 (0.0)	0.1 (0.0)	-0.0 (0.0)	0.2 (0.0)	0.3 (0.0)	0.1*** (0.0)
Health shocks	0.2 (0.0)	0.1 (0.0)	-0.0 (0.0)	0.1 (0.0)	0.1 (0.0)	-0.0 (0.0)
Members sick with malaria	0.2 (0.0)	0.2 (0.0)	-0.1*** (0.0)			
Frequency of 3 major shocks	0.9 (0.0)	0.7 (0.0)	-0.1 (0.1)			
Distance from road (km)	15.2 (0.4)	14.8 (0.2)	-0.3 (0.8)	6.6 (0.2)	7.9 (0.1)	1.6 (1.7)
Distance from market (km)	63.9 (1.0)	64.8 (0.6)	0.9 (2.1)	28.9 (0.5)	29.7 (0.3)	-0.0 (0.0)
Distance from boarder (km)	297.7 (2.3)	292.5 (1.4)	-5.3 (5.5)	97.1 (1.4)	95.5 (0.9)	-1.0 (0.0)
N	1,900	5,607		1,555	3,570	

Note: Difference is male minus female-headed households. Shock variables are dummies equal to one if household has experienced the corresponding shock in the past 12 months.

Table A.2: Marital status of female and male household heads

	Ethiopia		Uganda	
	Female	Male	Female	Male
Never married	2.5 (0.5)	2.0 (0.3)	4.6 (1.0)	3.5 (0.5)
Married	28.5 (2.3)	94.8 (0.5)	29.9 (1.6)	88.6 (0.8)
Divorced/Separated	18.1 (1.7)	1.8 (0.3)	22.7 (1.6)	5.8 (0.6)
Widow/Widower	50.9 (2.3)	1.5 (0.3)	42.8 (1.7)	2.2 (0.3)
N	1,926	5,610	1,408	3,332

Table A.3: Gross off-farm income and labor per person, and their share in total household income and labor supply, by region

Ethiopia						
	Tigray	Amhara	Oromia	SNNP	Others	National
Income (ETB)	1491 (450)	973 (153)	872 (168)	1208 (315)	2648 (952)	1124 (124)
Share in total income (%)	38 (4)	27 (2)	21 (2)	26 (3)	44 (5)	26 (1)
Labor (days)	25 (4)	17 (2)	13 (2)	19 (4)	29 (5)	17 (1)
Share in labor supply (%)	19 (3)	12 (2)	10 (1)	12 (2)	24 (4)	13 (1)
N	781	1610	1484	1940	1707	7522
Uganda						
	Central	Eastern	Northern	Western	National	
Income (1000 UShs)	2425 (255)	773 (223)	682 (94)	903 (119)	1052 (62)	
Share in total income (%)	71 (1)	45 (2)	45 (1)	42 (1)	49 (1)	
Labor (days)	100 (3)	79 (3)	78 (3)	95 (3)	76 (1)	
Share in labor supply (%)	80 (1)	66 (1)	68 (1)	68 (1)	69 (0)	
N	1386	1263	1384	1078	5124	

Table A.4: Difference in return from RNFE between female- and male-headed households

	Ethiopia			Uganda		
	<i>Gender</i>		Difference	<i>Gender</i>		Difference
	Female	Male		Female	Male	
RNFE income per capita:						
Households in RNFE	1588.1 (105.3)	2004.5 (128.5)	-416.4* (193.9)	1175.8 (133.4)	1602.2 (89.9)	-426.4** (157.9)
All households	1020.1 (74.1)	1129.7 (78.6)	109.6 (119.1)	1036.5 (117.3)	1253.9 (71.7)	217.5 (132.7)
Share in total income	36.5 (0.9)	23.4 (0.4)	13.1*** (2.0)	53.4 (0.9)	49.9 (0.7)	3.5** (1.2)
Off-farm labor(days/person)	16.7 (1.0)	17.2 (0.6)	0.6 (2.2)	71.1 (1.6)	91.0 (1.3)	19.9*** (2.2)
Share in labor supply	15.9 (0.7)	11.7 (0.3)	4.2* (1.6)	66.4 (0.8)	72.1 (0.4)	-5.7*** (0.8)
N	1,900	5,607		1,555	3,570	

Note: Income is in ETB and 1000 UShs per capita for Ethiopia and Uganda, respectively.

Table A.5: Gender difference in the types of non-farm enterprise in Ethiopia

	Gender		Difference
	Female	Male	
Non-farm enterprise:	19.8 (0.9)	23.7 (0.6)	-3.9*** (1.2)
Non-agricultural business	3.7 (0.4)	7.0 (0.3)	-3.3*** (0.7)
Processing agricultural outputs	7.9 (0.6)	5.6 (0.3)	2.4*** (0.7)
Trading business	4.1 (0.4)	5.3 (0.3)	-1.1 (0.6)
Service or sales	1.5 (0.3)	2.3 (0.2)	-0.7 (0.4)
Professional services	0.2 (0.1)	0.1 (0.0)	0.1 (0.1)
Transportation/moving services	0.2 (0.1)	0.3 (0.1)	-0.1 (0.2)
Hotel, bar or restaurant	0.2 (0.1)	0.1 (0.1)	0.1 (0.1)
Casual work	17.8 (0.9)	25.7 (0.6)	-7.9*** (1.2)
Employment under PSNP	8.8 (0.6)	8.6 (0.4)	0.2 (0.8)

Table A.6: Determinants of women's participation in RNFE

	Ethiopia		Uganda	
	Rural +	Rural	Rural +	Rural
Female x Head's age	0.01** (0.0)	0.00 (0.0)	0.00 (0.0)	0.00 (0.0)
Female x Head's age squared	-0.00*** (0.0)	-0.00*** (0.0)	-0.00*** (0.0)	-0.00* (0.0)
Female x Head completed primary edu	0.17*** (0.0)	0.15*** (0.0)	0.07** (0.0)	0.05 (0.0)
Female x Head completed secondary edu	0.13*** (0.0)	0.07* (0.0)	0.10*** (0.0)	0.15*** (0.0)
Female x Household size	0.03*** (0.0)	0.02*** (0.0)	0.01** (0.0)	0.01* (0.0)
Female x Dependency ratio	-0.00*** (0.0)	-0.00*** (0.0)	-0.29*** (0.1)	-0.26*** (0.1)
Female x Does the HH own cattle?	-0.19*** (0.0)	-0.11*** (0.0)	-0.06** (0.0)	-0.05 (0.0)
Female x Number of cattle owned	-0.01* (0.0)	-0.01* (0.0)	0.00 (0.0)	0.00 (0.0)
Female x Number of poultry owned			0.00 (0.0)	0.00 (0.0)
Female x Usufruct/ownership right over farmland	-0.14*** (0.0)	-0.05 (0.0)	-0.04* (0.0)	-0.02 (0.0)
Female x Landholding (hectare/adult)	-0.01 (0.0)	-0.01 (0.0)	0.00 (0.0)	0.00* (0.0)
Female x Experienced natural shocks	-0.05 (0.0)	-0.02 (0.0)	-0.01 (0.0)	0.02 (0.0)
Female x Health shocks	0.02 (0.0)	0.02 (0.0)	0.04 (0.0)	0.09* (0.1)
Female x Members sick with malaria	-0.03** (0.0)	-0.02* (0.0)		
Female x Frequency of 3 major shocks	0.01 (0.0)	0.01** (0.0)		
Female x Distance from road (km)	0.00 (0.0)	0.00*** (0.0)	0.00 (0.0)	0.00 (0.0)
Female x Distance from market (km)	-0.00 (0.0)	-0.00 (0.0)	-0.00 (0.0)	-0.00 (0.0)
Female x Distance from boarder(km)	0.00*** (0.0)	0.00*** (0.0)	0.00*** (0.0)	0.00* (0.0)
N	7,534	6,627	4,741	3,949

Note: Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is participation dummy. The coefficients presented above are marginal effects.

We also control for climatic conditions (precipitation during the wettest season and mean annual temperature) and topography. In addition, for Ethiopia, we have included zone FEs in all of the regressions. For Uganda, we have also included region and rural-urban FEs.

Figure A.1: Most owners of non-farm enterprises reported that smaller share of household income comes from the enterprise, Ethiopia

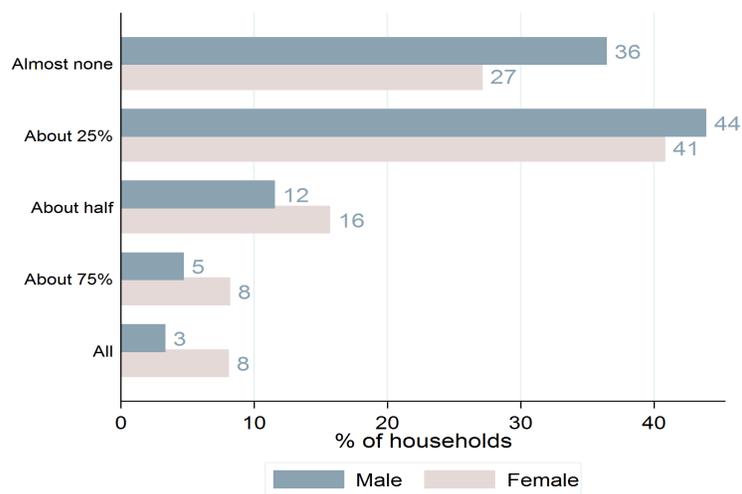


Figure A.2: The majority of female owned non-farm enterprise are operated inside/near residence

