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Occupational Sex Segregation in Agriculture

Evidence on Gender Norms and Socio-Emotional Skills in Nigeria

Smita Das
Clara Delavallade
Ayodele Fashogbon
Wale Ogunleye
Sreelakshmi Papineni

Abstract

Occupational sex segregation is a key driver of the gender gap in earnings. Using data from 11,691 aspiring agribusiness entrepreneurs across five states in Nigeria, this paper explores the gender gap in the sectoral choice decision, and especially the role played by norms around gender roles. When given a choice of 11 agricultural value chains in a government program, the majority (54 percent) of the entrepreneurs chose to enter into poultry, a value chain with relatively lower profit potential, and women were more likely to choose poultry than men. This paper finds evidence of more restrictive gender norms in Northern States, which lowers women's likelihood of crossing over to potentially more lucrative value chains. The gender gap in sectoral choice is also attributed to differences in work experience especially in agricultural activities and in the chosen value chain, as well as in land ownership and differential access to tertiary-level education. The paper shows that women with more experience in male-dominated value chains exhibit lower self-efficacy, which could reflect the challenges they face when deviating from social norms to operate within these sectors.

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1. Introduction

Occupational sex segregation is often cited as one of the key drivers of the earnings gap between men and women (Campos et al, 2019). Women tend to sort into different occupations than men, and those dominated by women tend to be less profitable. For example, in business, this can be observed through a higher concentration of women in certain business sectors and, in farming, a lower likelihood of women being included in cash crop markets (Goldstein et al. 2019; O'Sullivan et al. 2014). Occupation or sector choice represents one of the most fundamental economic decisions individuals make, and differences in access to capital, inputs, time, networks and labor as well as social norms around gender roles can govern the types of work in which women choose to engage and may lock them into lower-return employment options. Labor economists who study the gender earnings gap attribute much of the gap to a difference in skills, to hours worked, employment flexibility, as well as discrimination (Rose and Hartmann, 2004; Goldin, 2014). However, in Sub-Saharan Africa, cultural values and gender norms are likely to significantly constrain women's choices about whether and which types of work to pursue (Jayachandran, 2020).

Gender norms are shared expectations about how women and men should behave in a particular social group or culture. Women's economic opportunities and earnings may be constrained by a range of social norms that influence the types of roles and responsibilities that are acceptable for men and women and uphold widely shared conceptions of masculinity and femininity (Marcus and Harper 2014). Norms can exert a strong influence on behavior (Platteau 2000; Bicchieri 2006). For example, norms can lead to systematic differences between men and women in self-perceptions and aspirations. Norms (often subconsciously) encourage behaviors that are socially valued and discourage behaviors that elicit social sanctions (Campos et al. 2019).

In this paper we examine the gender gap in the sectoral choice decision in the context of agriculture in Nigeria, the extent to which social norms drive this choice, and its implications for women's socio-emotional skills. We provide analysis on the different beliefs held by a sample of 11,691 women and men that spans across five states in the North and South of Nigeria, a country which has diverse gender norms that are notably divergent between the Northern and Southern states. We use data collected from applicants to a Government of Nigeria (GoN) development program that seeks to create entrepreneurship opportunities within the agribusiness space to help address unemployment and underemployment among youth and women in the country, while contributing to the growth of the agriculture sector in Nigeria.[2] The program was designed to encourage men and women to start agribusinesses within the government's priority value chains by providing technical and business training plus an in-kind grant of inputs equivalent to 2million Nigerian naira (approximately US$5,300[3]). The project aims to support approximately 10,000 beneficiaries within the project lifespan and targets an equal representation of women and men.[4] During the application process for the program, each applicant was required to select an enterprise sector from any of the 11 prioritized value chains: cassava, rice, cashew, poultry, aquaculture, cocoa, maize, tomatoes, ginger, dairy and wheat[5]. These value chains were proposed by the project based on economic viability and the national objectives of food security, export potential and livelihoods promotion.

We find that when given a choice of 11 different value chains, the majority (54%) of entrepreneurs chose to enter into poultry, which is one of the least profitable value chains among the choices. In addition,

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[2] The GoN program is the Women and Youth Empowerment (WYEP) component of the Agro-Processing Productivity Enhancement and Livelihood Improvement Support (APPEALS) project which is a Federal Ministry of Agriculture and Rural Development (FMARD) program that was launched in 2019 and has plans to run to 2023.

[3] At November 2020 market exchange rate.

[4] The project targets 10% of beneficiaries to include people living with disabilities.

[5] The applicants also had to choose a segment of the value chain from either production, processing or marketing.

women were significantly more likely to choose poultry than men (a gender gap of 7.2 percentage points in the North and 3.6 percentage points in the South).[6] The popular choice of the poultry value chain suggests that the choice of business value chain may not have always been based on a clear assessment of market opportunities. We find that the poultry value chain does not provide the highest economic return based on a revenue and cost analysis, relative to the project's other value chains (see Appendix A2 for the relative profitability analysis; World Bank Project Appraisal Document, 2017; Yusuf et al. 2016; Akedere et al. 2020). The applicants were also not encouraged by the project officials to choose poultry over any other value chain. In this paper, using data collected at the application stage, we analyze why the sorting into poultry might have occurred. The extent to which restrictive gender norms influence gender-based occupational segregation by crop-choice could affect women's potential to profit from agribusiness and exacerbate the gender earnings gap. In this paper we examine when offered a choice of 11 crops to pick from, what factors made over 50% of the applicants select into the poultry value chain? Why were women more likely to make this choice than men?

Throughout this paper, the non-poultry value chains offered by the program are referred to as "crossover sectors" in the analysis, which follows terminology used in the entrepreneurship literature that describes women operating in non-traditional, male-dominated business sectors (Alibhai et al, 2017).[7] We begin by exploring the factors associated with operating in a non-poultry value chain by gender. We test for significant predictors of crossing over into the non-poultry sectors to identify those socioeconomic characteristics that may advantage or disadvantage women with respect to the choice of value chain. Among women, we find that being older, having more work experience, and owning land are positively correlated with the probability of choosing to enter a non-poultry sector. In the Northern states where we show that gender norms are more restrictive and embedded in traditional gender roles and behaviors, we find that perceived community norms[8] negatively correlate with the decision to cross over into a non-poultry sector. The more people in the community a woman perceives would speak badly of a woman who works, the less likely she is to cross over into a non-poultry sector in the North. Norms do not appear to play a part in crossing over in the South where norms around gender roles are more egalitarian.

Despite the centrality of norms and attitudes toward gender differences in the labor market, there is little empirical evidence on their relationship with economic outcomes and occupational segregation. Studies with relatively small samples in individual agricultural value chains suggest a close relationship between norms, access to resources, and gender-based occupational segregation (Kyasa & Msuya, 2016; Mensah-Bonsu et al. 2019). For example, in agriculture, men are often involved in tasks that require the use of expensive assets such as livestock or machinery (plowing, threshing), better access to information (seed selection and technology adoption), and traveling longer distances (transporting goods to a market); and women are often involved in tasks tied to detail or routine work (transplanting, weeding, raising seedlings),

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[6] The WYEP APPEALS applicants were not compelled to choose poultry or any other value chain. Each state would emphasize priority value chains, for example, Kaduna emphasized that they are focusing on maize, ginger and dairy. However, applicants had the freedom to choose from any of the 11 options.

[7] While the use of the term crossovers follows the terminology used in the entrepreneurship literature, that defines a crossover sector as one where women have entered a relatively more profitable sector dominated by men, in this paper we use the term "crossovers" to simply refer to any sector other than poultry within the data. Male-dominated sectors in the entrepreneurship literature are often defined as those in which more than 75 percent of entrepreneurs report most businesses within their sector are owned by men (i.e. an overrepresentation of men) (see Alibhai et al. 2017). Since in our data we are not able to distinguish which sectors, in general, have an overrepresentation of men we do not choose to describe a value chain as "male-dominated" or "female-dominated". Since we observe that the poultry sector has the largest gender gap in terms of entry we describe this as a more female-concentrated value chain and the term "crossovers" is simply used for ease of interpretation to describe the act of crossing over into sectors other than poultry.

[8] Perceived community norms are defined in two ways: (1) the share of the community who would speak badly of a woman who works, and (2) the share of the community who think a man is a bad provider if his wife is working for pay.

care responsibilities (wellbeing of livestock), and home-based work (carrying goods from field to home, processing, storage). In addition, men may be more involved in production and trading while women work in processing and marketing, and women often produce less profitable staple food crops while men produce cash crops (Croppenstedt et al., 2013; Kyasa & Msuya, 2016; World Bank, 2011). In our Nigeria study sample, we find evidence of a gender gap in the type of agricultural value chain chosen, however, we do not find evidence of a gap in the segment of the value chain that women and men choose.[9]

Norms around the acceptability of women's work itself, women's mobility, capacity to interact with men and/or the male breadwinner status could all be at play when it comes to a woman's choice of which agricultural value chain to enter. The unequal burden of *domestic responsibilities* for women may limit the time available for work or her ability to seek work far from home; the communal belief that women should not *earn more than their husbands* may limit a woman's aspirations, agency, and ability to obtain capital to grow a business; norms surrounding unequal land inheritance, and *property rights* may limit women's ownership and control over land and other assets; limited *decision-making power* may affect women's access to capital, labor, choice of work, and use of transport; customs that *prevent men from talking to women* without the permission or presence of her husband may make men less open to collaborating, teaching, sharing information, and creating contracts with women. Gender norms which restrict female interaction with the opposite gender limit development of social and business networks and access to information as well as input/output markets (O'Sullivan et al. 2014). All of these factors could contribute to a productivity trap such that women are unable to obtain the capital, experience, and networks to be able to enter new markets or produce at scale (Mensah-Bonsu et al., 2019; Uteng 2011; Roy et al., 2015). Lower access to inputs such as land, capital, labor, fertilizer extension services, tenure security, and information, drives much of the gender differential in agricultural yield (Croppenstedt et al., 2013). However, *returns* to inputs are also lower among women and there is significant regional variation (Peterman et al., 2011; Oseni et al., 2014). Our findings suggest that gender norms may play a role in this regional variation.

Defying norms may come with costs that range from violence to social ostracism or poor marriage prospects and mental health. These costs have generally been termed the "backlash effect" (Rudman and Fairchild, 2004). Even simple deviating behaviors, such as advocating for oneself can have repercussions on the economic returns and likeability of women (Bowles et al., 2005). Women in positions of leadership, for example, are found to be less liked if they are assertive but be deemed less competent if they are not assertive (Amantullah & Tinseley, 2013). Those who face norm-driven backlash from working in non-traditional environments could potentially experience reductions in their socio-emotional skill measures, such as self-esteem or self-efficacy. In Ethiopia, for example, women who operate in non-traditional, male-dominated business sectors report facing greater challenges, particularly in: getting respect from male employees, facing difficulties in building networks, and feeling despised by other women business owners (Alibhai et al. 2017). It is then unsurprising that gender inequitable norms have been found, in some instances, to have a negative correlation with self-esteem (Stark et al., 2018). In this paper, we consider the possibility of a backlash effect and hypothesize that women who enter non-traditional sectors may face resistance or obstacles from their work and domestic environment in response to non-conformist behaviors that may negatively impact their self-efficacy. To mitigate the risk of reverse causality, we examine this potential backlash against women transgressing gender norms in the North by examining the correlation between years of experience in a non-poultry sector and socioemotional skills measures, including self-efficacy. Our identification strategy relies on the assumption that lower levels of socio-emotional skills are unlikely to increase the number of years of experience in a non-poultry sector. We

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[9] Only in Lagos state do we see a difference where more women choose to enter the marketing segment relative to men who are more likely to enter the production segment.

find that self-efficacy, perseverance and interpersonal skills are lower for women with more experience in non-poultry sectors in the North where gender norms are indeed more restrictive.

In order to circumvent restrictive norms around gender roles, exposure via male role models (Campos et al., 2017; Alibhai et al. 2017) and socio-emotional skills (Bandiera et al., 2014) may play a key role, in addition to ensuring access to traditional resources and addressing norms directly. For example, a recent study in Saudi Arabia showed that simply updating male perceptions of what other men in their community think about women working outside the home increased married men's willingness to help their wife search for a job (Bursztyn et al. 2020). Similarly, an intervention designed to encourage husbands to transfer or register contracts in their wife's name in Uganda was effective at increasing women's integration into more lucrative value chains (Ambler et al. 2018). Conceptually, higher self-confidence may be a prerequisite for being willing to defy norms and shed fears of social judgement (Campos et al., 2015) and upgrade career aspirations (Correll, 2004). Personal initiative may be required for women to explore new products and businesses (Campos et al., 2017; Klinger et al., 2013), expand social networks, and obtain access to information and capital. Perseverance may be essential to enduring these constraints and the backlash from defying norms. The limited evidence that exists on socio-emotional skills in agriculture is promising: one study from Malawi found that socio-emotional skills were positively correlated with higher rates of adoption of cash crops (Montalvao et al., 2017).

The remainder of this paper is organized as follows. Section 2 describes the data sources, measurement procedure, and sample and provides analysis on how norms may translate into constraining behaviors. Section 3 outlines our empirical strategy used for the analysis. Section 4 discusses the results and section 5 concludes.

2. Data, Measurement and Sample Description

2.1. Data sources

Our main data source is from a quantitative survey conducted in August-November 2019 of 11,691 individuals (5,469 men and 6,222 women) across Lagos, Kaduna, Kano, Kogi and Cross River states in Nigeria. The dates of the data collection across the five states are as follows: Kogi 21st to 26th August, Lagos 2nd to 5th September, Kano 2nd to 7th October, Cross River 22nd to 27th October and Kaduna 12th to 17th November 2019. The survey was administered during the interview stage to applicants of the Government of Nigeria's Agro-Processing, Agricultural Productivity Enhancement and Livelihood Improvement Support[10] (APPEALS) project. The APPEALS project will provide economic support to beneficiaries of the program through the provision of technical and business trainings and input grants equivalent to approximately 2million Nigerian naira (approximately US$5,300[11]). More specifically, we focus on the applicants to the Women and Youth Empowerment Program (WYEP) component of the APPEALS project that targets both men 18-40 years and women older than 18 years (no upper age limit). The survey was conducted as part of a listing exercise for an ongoing randomized controlled trial (RCT) to assess the effectiveness of different types of socio-emotional skills training that will be offered to agribusiness entrepreneurs who are selected to be part of the WYEP APPEALS project.[12]

The survey at screening stage collected information from all APPEALS WYEP applicants on their chosen value chain out of 11 possible value chains. The 11 value chains available in the APPEALS WYEP project

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[10] APPEALS is a Government of Nigeria project with the objective "to enhance the agricultural productivity of small and medium scale farmers and improve value addition along priority value chains in the participating states".
[11] At the November 2020 market exchange rate.
[12] AEA registry for the RCT can be found here: https://www.socialscienceregistry.org/trials/6134.

include: aquaculture, rice, dairy, maize, poultry, tomatoes, cashew, cassava, cocoa, ginger and wheat. The choice of segment of the value chain out of three choices was also collected which could include: production, processing or marketing. The short survey elicited information on social norms towards women working and socio-emotional skills, as well as decision-making, demographic characteristics and current and past employment status. Due to the constraints on the time to complete the survey, the questions measuring a set of socio-emotional skills were collected only from a random sub-sample of 50% of applicants whereby the randomization was automatically completed within the enumerators tablet stratified by gender and state.

The survey duration was approximately 15 minutes and was conducted during the interview stage for the APPEALS WYEP project. In all the five states, trained enumerators administered the short survey to WYEP applicants who had verified their identity and submitted the relevant documents to be considered for the project. The interview for the project consisted of a few short questions from program officials and involved meeting project personnel, officers from the Ministry of Agriculture and some well-established agribusiness owners in the state. The project was advertised in several media outlets including newspapers, social media, radio and TV stations in Nigeria. Depending on each state, prospective applicants were required to complete either paper or web-based applications with evidence of fulfilling eligibility criteria.[13] By the close of application and in total, 133,584 completed applications were received and screened using the eligibility criteria, 9% of the total applicants were invited for face-to-face interviews with panels constituted in each state and 6% (8,080) of the total applicants were selected for the WYEP.

We supplement the data collected during the listing exercise with further information collected during a 30 minute computer aided telephone interview (CATI) baseline survey for the RCT impact evaluation conducted in June-July 2020. The baseline survey was collected for a subsample of approximately 6,000 applicants who were successfully selected for the APPEALS WYEP project across the same five states: Kano, Kaduna, Kogi, Cross River and Lagos states. The information collected during the baseline survey included questions on an additional gender norms topic, labor activities, empathy in relationships, and further socio-emotional skills questions. The baseline survey was conducted during a lockdown period in Nigeria enforced by the government to contain the spread of coronavirus and the survey also included questions on the applicants' experiences during the COVID-19 pandemic. A total of 5,962 observations from the baseline survey were merged with the screening data. The applicants who were selected for the APPEALS program, on average, do not differ along observable characteristics compared with the applicants who were not selected for the program. Since the baseline survey data was only collected for a portion of the sample of applicants most of the analysis in this paper relies on the measures collected for the full sample of 11,691 applicants during screening. However, we use the data from the baseline survey to add substance to the argument that restrictive gender norms can translate into certain behaviors that may disadvantage women's labor outcomes. In the main analysis of the paper we also present subgroup analysis by region, defined by North and South, where the North includes data collected from Kano, Kaduna, and Kogi states and the South includes Cross River and Lagos states.

2.2. Measuring norms and socio-emotional skills

The survey collected data on both norms and individuals' *personal beliefs*, specifically on the acceptability of women's work (Bicchieri, Lindemans and Jiang, 2014; Bernhardt et al, 2018). First, we elicited individuals' personal belief regarding the appropriateness of women's work outside the home for pay ("Individual belief" coded as 0/1 where 1 is the respondent believes women cannot work outside the home; and 0 if

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[13] The eligibility criteria for the men included being aged 18 to 40 years, unemployed graduates of universities or colleges of agriculture or completed secondary education with minimum of 18 months experience in agricultural value chains. The same criteria were set for women with some exceptions: women above 40 years of age with less than senior secondary education but with experience in the agricultural value chain were still eligible for the program.

respondent believes women can work outside the home). Second, to measure individuals' *perception of community norms,* respondents had to indicate out of 10 neighbors in their community: how many they think would speak badly of a woman if she worked for pay, and how many believe that a man is a bad provider if his wife is working for pay.[14] These norm constructs give us a measure of individuals' perceptions of what others around them think i.e. the share of the community they believe would judge a woman badly for working for pay and the share they believe would judge a man badly if his wife were to work for pay ("Perceived community beliefs judge a woman/man badly" coded as a 0-100%). When a woman works, both genders may face norms costs imposed by those community members who disapprove of women working. Therefore, in our analysis we assume that the decisions around female labor can be costly for both women and men.

In the baseline survey questionnaire, we included an additional set of questions to capture norms and personal beliefs around the male breadwinner status. We elicit individuals' personal beliefs by asking if they agree or disagree with the statement: "if a woman earns more money than a man it's almost certain to cause problems" (coded 1 if agree and 0 if disagree) that is taken from the World Values Survey. The perception of the community norm is collected by asking the respondent how many neighbors (out of 10) do you think believe that if a woman earns more money than a man its almost certain to cause problems (coded 0-100%).

The reference group in all our norms measures is kept general (10 neighbors) and might not be the most salient influence on people's behaviors. However, since it is an empirical question whether our behaviors are more strongly influenced by people with whom we have a close personal connection or people in our broader community, we decided to keep the reference group broad. Norms are expected to influence behavior through expectations of what others in the reference group do or approve (Gauri, Rahman and Sen, 2019).[15] Socio-emotional skills were measured by asking respondents to rate their level of agreement with different attitudinal statements eliciting beliefs about their own abilities (see Appendix A1). The socio-emotional skills measures include scales examining personal initiative (PI), generalized self-efficacy (GSE), and perseverance. The personal initiative scale was adopted from the Frese et al., (1997) measure of initiative which has been tested and validated in South Africa, Zimbabwe, and Namibia (Frese et al., 2007). The generalized self-efficacy scale is adopted from Schwarzer et al. (1995) which has been tested in 25 countries (Scholz et al., 2002). Individual statements examining creativity, sociability, challenge seeking, networking and conformity were also included in the screening survey. We construct a composite index for the personal initiative, self-efficacy and perseverance measures that is the normalized z-score of the first principal component of the different items (reversing any negatively-coded items). For the index scale measures, scale reliability is assessed using Cronbach's alpha. (See Appendix A3 for a description of the statements included in each socio-emotional skills measures and the reliability analysis to test for internal consistency.)

2.3 Sample Description

Table 1 provides summary information of the sample, split by applicants' gender, for all the states pooled for 11,691 individuals (columns (1) and (2)), Northern states 7,258 individuals (columns (3) and (4)) and Southern states 4,433 individuals (columns (5) and (6)). The last column in each panel labelled "t-test difference" gives the value and significance of the difference in means between the male and female sample with 45% and 55% of the 11,691 participants men and women, respectively. Female applicants are, on average, three years older than their male counterparts (34 compared to 31). This likely reflects the

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[14] To simplify the question for respondents, the survey asked them to report a number out of 10. We then convert this number to a proportion i.e. out of 100%.

[15] In follow-up work for the impact evaluation, we will consider including variants in the reference group to examine whether the opinions of certain people matter over others with respect to the female labor supply decision.

program selection strategy that restricted access to men between 18 and 40 years old i.e. those considered to be "youth" by the program, while not putting restrictions on women's age. Men live in slightly larger households, especially in the North, which they head in 94% of the cases compared to 84% for women, but report having fewer children. Women in the sample are also more likely to be married (27% of women compared to 52% of men in the sample are never married). Also, as a consequence of the program eligibility criteria, almost all sample applicants are literate and have a comparable number of years of experience (7.5 years on average). Educational attainment is relatively high for a development program with 68% of men and 62% of women in the study sample achieving at least some tertiary education.

Though women are 3 years older than men, on average, they have only 0.87 more years of work experience than men in the South and 0.81 *fewer* years of work experience in the North. However, the work experience is different in nature, with male applicants having more experience in agricultural activities, especially working on their own farm (47% of men), while women are 5 percentage points more likely to have worked on non-farm activities (42% of women) and 3 percentage points more likely to have been unemployed in the past 30 days (15% of women). In our sample, men and women are equally likely to be current business owners (58%). Men report earning significantly higher monthly profits and household income than women, with these gaps driven by the Northern States while in the South, women report slightly higher profits than men. Men are overall 3 percentage points more likely to report their household owns land, relative to an average of 78% among women respondents.

Turning to personal beliefs and norms, while individuals rarely hold the personal belief that women should not work outside the home within the sample (only 6.2% of men and 2.6% of women), they are more likely to perceive that their community peers hold these views. Our norms measures suggest, on average, men and women believe 22.2% and 15.8% of their neighbors, respectively, would speak badly of a woman who works, and 21.5% and 17.2% of their neighbors would judge a man is a bad provider if his wife is working for pay.[16] Men are more likely to hold conservative views of women's role than women themselves, especially in Northern states where gaps are significantly larger between women and men's beliefs than in the South.[17] We further explore norm differences between Northern and Southern states in subsection 2.5 below and examine which specific behaviors they embed into.

In terms of the self-reported reasons for choosing the selected value chain, approximately 25% of both men and women said they chose their particular value chain based on an assessment of market opportunities[18]. Where men and women differ in their reasons: men were more likely to say they already had experience in the chosen value chain and women say they wanted to pursue an interest, hobby or a passion. As may be expected, men in the sample have significantly more decision-making power than women measured by their ability to make a sole decision on the purchase of a large asset. Among married individuals, 49.6% of men and only 11.4% of women reported that they could make a sole decision on purchasing a large asset; and men are 11.7 percentage points less likely to involve their partners in the decision.

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[16] The norm on women's work in the study sample has a relatively lower threshold than the male breadwinner norm collected during the baseline survey among the APPEALS beneficiary sub-sample. On breadwinner, we find 40% of men and 30% of women hold the personal belief that if a woman earns more money than a man it is almost certain to cause problems. In terms of the perceived community norm, men and women believe 53% and 46% of their neighbors, respectively, think that if a woman earns more money than a man it is almost certain to cause problems. The norms we explore in this paper around women working are found to be positively correlated with personal beliefs on the male breadwinner norm for both women and men. The extent to which the norms can affect behavior is further explored in Section 2.5.

[17] It is an empirical question as to what threshold on a norm will still be perceived as a social sanction and impact behavior which we expect will also differ depending on the norm in question.

[18] We use this to examine whether being an "opportunity entrepreneur" helps you to enter the higher-return non-poultry sectors in Table 4.

Finally, female applicants report significantly lower levels of socio-emotional skills than men on personal initiative, self-efficacy, careful thinking, creativity, interpersonal sociability, and interpersonal network but no significant difference on challenge-seeking and perseverance. Women also present higher levels of conformity than men in terms of keeping up with traditions and learned customs. Interestingly, gender differences in socio-emotional skills, mostly in women's disfavor, are driven by the Northern States, with limited significant differences between men and women found within the Southern states.

2.4. Agricultural Value Chain Choice

In Table 2, we report data on the agricultural value chain selected among male and female applicants for the full sample and separately for Northern and Southern States. The main motivation for this paper comes from an analysis of the gender gap in the selection of the poultry value chain as can be found in Table 2. We find the majority (54%) of program applicants select into poultry (57% of women and 51% of men, with a larger gender gap of 7.2 percentage points in the North than 3.6 percentage points in the South). In Appendix A2 we examine the economic returns to poultry and conclude that poultry has relatively lower returns than some of the other agricultural value chains included in the APPEALS WYEP project. In Table 6 in Appendix A1 we also provide further detail on the agricultural value chain choices by presenting the list of the top value chain choices distributed by state and across gender. Poultry is the top value chain chosen by both men and women in all five states covered by the project.

The remaining program applicants distribute themselves more evenly across the other 10 value chains (12% select aquaculture, 11% for cassava, and 9% for rice, with less than 5% choosing each of the remaining value chains[19]). Aside from poultry, women are more likely to opt into cassava than men but less likely to opt into cocoa, dairy, maize and rice.

In this paper we explore horizontal segregation with the key finding that more women sort into the relatively lower-return poultry value chain than men. However, one should note that since applicants also had to choose a segment of the value chain out of three possible choices: production, processing and marketing, there is also potential to examine vertical segregation. The bottom panel in Table 2 shows that, in terms of the segment of the value chain, most applicants to the APPEALS WYEP project choose production (78%), where men are more represented overall in the production segment (81.6% compared to 75% of women). However, on closer inspection, we find that any gender gaps in the choice of segment are driven by differences in the state of Lagos, and Kogi to a lesser extent, while in all other states there is no significant gender difference in the segment chosen. In Lagos more women choose to do marketing over production relative to men (in Table 2 this can be seen as a 10.7 percentage point gender gap in marketing in the South). With the majority of applicants entering production overall, perhaps the higher likelihood of women entering marketing in Lagos simply relates to applicants in Lagos having better access to markets which opens up the potential for choosing other segments in the value chain. Or perhaps Lagos women have less access to inputs such as agricultural land or labor in the city that are required to operate in the production segment. Given the limited variation in the segment choice, in the rest of this paper we focus on the value chain choice alone i.e. on horizontal segregation.

The popularity of poultry as the main value chain of choice in the APPEALS WYEP project could be for a variety of reasons. For example, the short gestation period may lead to quicker economic returns e.g. in approximately 8-10 weeks meat type chickens are ready for market unlike cattle or many other crops. In addition, there may be a lower labor requirement than crop farming (small to medium poultry size can be managed by self/family members). In Nigeria, where multiple religions co-exist, poultry is acceptable across religions (Muslims, Christians and Traditionalist) unlike ventures like piggery. In addition, land size may be

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[19] Note the wheat value chain is not listed in Table 2 since less than 1% of program applicants chose the wheat value chain.

a factor where up to 500 chickens or more can be kept in a home-based garden with a shed, unlike many crops that require larger expanses of land. Since poultry farming can be operated from a home-based garden or near the home and does not require traveling out to the fields, perhaps its choice allows multi-tasking and *does not require breaking social customs.* Conservative gender norms with greater household responsibilities for women may indeed reduce: (i) their ability to take-up work outside the home (here, outside poultry), (ii) their control over capital/land/family labor, and their agency to make choices that align with market opportunities/interest, and (iii) their exposure to business/access to information if husbands and wives do not discuss it. One hypothesis we test in this paper is that these more restrictive norms around gender roles, particularly in the North, correlate with value chain selection. In the next section we substantiate our argument around norms by examining how the likelihood of judgement from the community affects behavior, differentially in the North and in the South.

2.5. Norms and behaviors in the North and South of Nigeria

Norms are expected to guide behavior to the degree that group members adopt the group identity. In Tables 3a and 3b we examine how norms around gender roles embed into specific behaviors for women and men separately and whether there are significant differences between the North and the South. We estimate the following equation using an OLS regression:

$$Y_{ij} = \beta_0 + \beta_1 Norm_{ij} + \beta_2 South_{ij} + \beta_3 Norm \times South_{ij} + \varepsilon_{ij} \text{ (EI)}$$

where Y_{ij} is the outcome of interest i.e. a set of specific behaviors measured during the baseline survey. $South_{ij}$ is a region dummy variable equal to 1 if the respondent resides in a Southern state and 0 if in a Northern state. The coefficient β_1 gives the correlation of the perceived community norm of being judged badly for women working ($Norm_{ij}$ coded 0-100) with the behavior outcomes in the North. To examine differences between Norms in the North and South we report the estimates and p-value for $\beta_1 + \beta_3$ at the bottom of the tables. All regressions cluster standard errors by local government area (LGA).

In Table 3a we find that women who perceive a larger portion of the community judges them badly for working outside the home spend fewer daily hours working for pay and spend more time on household chores and care activities. These correlations are significant in the North while they are not in the South. In addition, in Northern States, women with higher perceived norms with regards to the community judging them badly for working outside the home speak less frequently with a partner about employment or business and are more likely to have their business located at home (both significant at the 1%-level). Women in the South spend 56 additional minutes working for pay compared to women in the North, 1 hour 47 minutes less on household chores and 1 hour 23 minutes less on care activities. They are significantly more likely to discuss employment or business topics with their partner and less likely to have their business at home.

In Table 3b we conduct a similar analysis for the sample of men and find that men who perceive a larger portion of the community judges a man badly for female labor are less likely to involve their wives in the household decision-making process and will speak less frequently with a partner about employment or business.

In summary, we find evidence that norms around gender that restrict women's role to tending to household and care activities and limit their work outside the home for pay are substantively more prevalent in the North than in the South and correlate with actual restrictive behaviors for women in the North. In the next section we present the empirical strategy used for examining the main sectoral choice research question and its implications for women's socio-emotional skills.

3. Empirical Strategy

3.1 What factors are associated with crossing over into non-poultry sectors for women and men?

To examine the factors associated with entering a potentially higher-return non-poultry sector we first label these sectors as "crossover sectors" that follows the terminology used by micro-studies in entrepreneurship that describe the act of women crossing over into the non-traditional, male-dominated sectors (see Campos et al. 2017, Alibhai et al. 2017 and Goldstein et al. 2019). In Equation E2 the unit of observation is individual i in community j. In the following ordinary least squares (OLS) regression we examine the gender-disaggregated characteristics that correlate with crossing over into a non-poultry "crossover" value chain and estimate for individual i:

$$Crossover_{ij} = \beta_0 + \beta_1 Male_{ij} + \beta_2 X_{ij} + \beta_3 Male \times X_{ij} + \beta_4 Z'_{ij} + \varepsilon_{ij} \quad \text{(E2)}$$

where $Crossover_{ij}$ is the outcome of interest that is a dummy variable equal to 1 if the individual i in community j chooses any non-poultry sector; and equal to 0 if the individual i chooses the poultry sector. We are interested in what predicts crossing over into a non-poultry sector and whether there is a gender differential. $Male_{ij}$ is a dummy variable equal to 1 for male and 0 for female. X_{ij} is a vector of explanatory variables that examines the following themes: norms, opportunity entrepreneur, education, work experience i.e. exposure to value chain, type of work experience (farming and non-farm enterprise activity), and land ownership. These explanatory variables are grouped into themes and sequentially added to the regression in each subsequent column in Table 4. The coefficient estimated for each explanatory variable X_{ij} (β_2) gives us the marginal effect of X_{ij} on $Crossover_{ij}$ at $Male_{ij}$=0 (i.e. for women), while β_3, the coefficient on the interaction term $Male \times X_{ij}$, gives us the differential effect of X_{ij} on $Crossover_{ij}$ between men and women. The marginal effect of X_{ij} on $Crossover_{ij}$ at $Male_{ij}$=1 (i.e. for men) is given by $\beta_2 + \beta_3$. The last column in each panel in Table 4 reports the estimates and significance level for $\beta_2 + \beta_3$. All regressions cluster standard errors by local government area (LGA) where there are 129 LGAs in the sample. In addition to the full sample results, sub-group analysis of the results for Northern states (Kano, Kaduna and Kogi) and Southern states (Lagos and Cross River) are also presented in Table 4.

The measures of norms include the individual belief that a woman should not go out to work (1 if agree and 0 if disagree) and the perceived community norm of the percentage of neighbors out of 100 who would judge a woman who works out of the home among women and would judge a man as a bad provider if his wife works among men.[20] Opportunity entrepreneur is a dummy variable equal to 1 if the individual said the reason for choosing the value chain was because they saw a good business opportunity; and 0 otherwise. Education is measured as a dummy variable equal to 1 if the beneficiary has at least tertiary education and 0 otherwise. Work experience in the value chain is measured in years, and current work status includes working on own farm and non-farm activities in the last 30 days (0/1). Land ownership is a dummy variable if household owns land.

Z_{ij} is a vector of additional control variables. In columns (2) onwards in Table 4 we control for this set of demographic and household characteristics in the regressions, including: age, household size, number of children, marital status (1 if the beneficiary is married and 0 otherwise), household income and decision making power over the purchase of a refrigerator in the household (1 if included solely or jointly in the decision and 0 otherwise). In addition to the main analysis we also run the following OLS regressions to

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[20] The perceived community norm measure considers female labor being costly for both women and men.

examine the correlation between the crossover decision and socio-emotional skills; and restrictive norms and gender behaviors.

3.2 How does exposure to a non-poultry crossover sector correlate with women's socio-emotional skills?

Equation E3 presents our OLS regression specification for exploring the correlation between years of experience in a non-poultry or "crossover" sector or exposure and socio-emotional skills. In Table 5 we include results for the full sample and North and South (Tables 5a and 5b) separately for women only:

$$Y_{ij} = \beta_0 + \beta_1 Crossover_{ij} + \beta_2 Q_2 + \beta_3 Q_3 + \beta_4 Q_4 + \beta_5 Q_2 \times Crossover_{ij} + \beta_6 Q_3 \times Crossover_{ij} + \beta_7 Q_4 \times Crossover_{ij} + \beta_8 Z'_{ij} + \varepsilon_{ij} \quad \text{(E3)}$$

where Y_{ij} is the outcome of interest i.e. a set of socio-emotional skills outcome variables coded 0-5 including personal initiative, self-efficacy, perseverance, interpersonal sociability and network, creativity as well as conformity (See Section 2.2 and Appendix A3 for details of measurement of these skills). We are interested in examining how exposure to the value chain that was selected for the APPEALS WYEP project correlates with socio-emotional skills. Using the number of years of experience in the value chain we divide this variable into quartiles for exposure: Q1 = 0 years of experience in value chain; Q2 = 1-2 years; Q3 = 3-5 years and Q4 = more than 5 years. In equation E3 we examine the correlation of crossover interacted with the exposure quartiles on a range of socio-emotional skills outcomes. The reference category is quartile Q1 exposure to poultry i.e. 0 years of experience in poultry. The regression is restricted to women only and the coefficient β_1 on $Crossover_{ij}$ gives the difference in outcomes of women in non-poultry crossover sectors to women in poultry with no years of experience in the value chain (i.e. zero exposure). The coefficients on the exposure quartiles (β_2, β_3 and β_4) gives the relationship of having incrementally higher years of exposure to the value chain among women in poultry. $\beta_2 + \beta_5$, $\beta_3 + \beta_6$ and $\beta_4 + \beta_7$ give the same for women in non-poultry crossover sectors respectively. We include a vector of controls (Z_{ij}) in the regression including: age, household size, number of children, marital status, household income and decision making power over the purchase of a refrigerator in the household. Standard errors are clustered by local government area (LGA). In addition to the full sample results, sub-group analysis by region are also presented in Tables 5a and 5b.

4. Results

4.1 Explanatory factors associated with crossing over into higher-return non-poultry value chains

Table 4 presents the regression results for equation E1 for the full sample, and for Northern states in Table 4a, and Southern states in Table 4b. Table 4 column (1) presents the gender gap in crossing over i.e. the simple difference between men and women. Overall, men are 5.5 percentage points more likely to cross over to non-poultry sectors than women (Column 1), and 5.8 percentage points more likely when controlling for standard sociodemographic characteristics. This difference in the North (7.2 and 8.8 percentage points respectively) is double that of the South (3.6 and 2.8 percentage points respectively), where prevailing norms are more inducive to women working outside the home. Recall that 7.9 percent of men and 3.1 percent of women believe that women cannot work outside the home in the North, compared to 3.0 and 1.8 percent in the South respectively (refer to Table 1).

In the remaining columns (3) to (7) we explore the factors correlated with crossing over by sequentially conditioning on norms (Column 3), opportunity entrepreneur (Column 4), tertiary education (column 5), work experience (Column 6) and land ownership (Column 7). Our preferred specification is in Column (7) with the full set of controls.

We first examine how personal beliefs and norms affect women's decision to cross over into non-poultry sectors. We find indeed that women's perception of the beliefs that people in their community hold towards working women out of the home is related with their decision to cross over. Perceiving that one's community judges a women badly for working negatively correlates with crossing over, only for women in the North where such norms are indeed more prevalent. More precisely, in Northern states, the perception of 10 additional persons judging women badly for working over 100 in the community translates into a 1 percentage point reduction in the probability of crossing over for women, significant at 99% confidence (Table 4a). This negative correlation is not significant in Southern states (Table 4b). We find similar patterns with personal beliefs. Women's personal beliefs on their inability to work outside the home are negatively correlated with the probability of crossing over, although these correlations are not significant (Column 3).

We also find that, in the North, value chain selection based on seeing a good business opportunity to make money is positively and strongly correlated with women crossing-over, slightly more so than with men crossing-over (Table 4a, Column 4), while it is not correlated with women's decisions in the South (Table 4b). In terms of skills, in contrast with the entrepreneurship literature (Campos et al. 2017; Alibhai et al. 2017), we find tertiary education to positively correlate with sectoral choice for women in the South. While this pattern is not seen among women in the North, education appears to matter in the decision to cross over among men in the North, where their access to tertiary education is significantly higher than that of women (Table 4a, Column 5). Access to tertiary education thus helps explain a portion of the gender gap in crossing-over.

To better explain the gender gap in crossing-over to non-poultry sectors, we next turn to work experience (Column 6). Men's higher likelihood of crossing over is largely driven by men having more exposure to the non-poultry sectors measured by years of work experience in their chosen value chain. On average, each additional year translates into a 2.7 percentage-point increase in the probability of crossing over for men, compared to a 1.7 percentage-point increase for women. The gender gap in crossing-over is also driven by men being more likely to be working on their own farm in the past 30 days, which increases the probability of crossing over by 12.1 percentage points for men, compared to 3.2 for women, both significant at the 99% confidence level. However, this correlation between the types of work and crossing over is only significant for women in the North and not for women in the South. In the North, women's decision to cross over is significantly correlated with working on both farming and non-farm activities in the last 30 days. Lastly, in all states included in the study, women's crossover decision is positively associated with their household owning land (Column 7).

To summarize these findings, perceived restrictive community beliefs towards women working outside the home correlate strongly with women's decision not to cross over into higher-return value chains outside of poultry. This is particularly true for women in the North where such restrictive beliefs are indeed more prevalent than in the South, especially among men, and where community beliefs correlate strongly with gender roles and behaviors as shown in Section 2. Whether their household owns land also appears to be an important correlate for women crossing over. Finally, gender gaps in crossing over are largely explained by men's longer work experience, especially in agricultural activities and higher access to tertiary level of education in the North.

4.2 *Exposure to Non-Poultry Crossover Sectors and Socio-Emotional Skills*

While the selection of the value chain for the project was made pre-program at screening stage we cannot rule out the possibility that some individuals are already operating in their chosen value chain at the time of measurement. In the following analysis we consider this fact by examining how exposure to the value chain that was selected for the APPEALS WYEP project correlates with the individual's socio-emotional

skills. Using the number of years of experience in the value chain we divide the variable into quartiles for exposure: Q1 = 0 years of experience in value chain; Q2 = 1-2 years; Q3 = 3-5 years and Q4 = more than 5 years. Among female respondents as many as 85% said they already had some prior experience within their value chain i.e. years of experience is greater than zero. In Table 5 we examine the correlation of crossover interacted with the exposure quartiles on a range of socio-emotional skills outcomes.[21]

Table 5 shows estimated results from regressing a set of socio-emotional skills outcome variables for women on crossing over interacted with the four exposure quartiles (refer to Tables 4a and 4b that shows the results for the subgroup analysis of women in North and South sample only). The reference category is quartile Q1 exposure to poultry i.e. 0 years of experience in poultry. Overall, more years of exposure to poultry sectors, particularly for women in the South, is positively correlated with the following socio-emotional skills measures: personal initiative (PI), perseverance and interpersonal network (i.e. Q3 and Q4, significant at the 5% level). Among women in the South, those who cross over with no years of experience in the value chain (Q1) record significantly higher levels of PI, perseverance and creativity. We hypothesize that perhaps women in the South who wish to enter into the higher-return crossover sectors that are less familiar to women are required to have a greater stock of PI to enter (i.e. we expect reverse causality where higher PI leads to entry into a crossover sector for the first time). This positive correlation suggests that when it comes to the decision to cross over into non-poultry sectors, only those women who have higher socio-emotional skills may choose to enter.

The pattern for women with more years of experience in the crossover value chains (Q3 and Q4) is somewhat different, especially in the Northern States. Overall, we find a negative correlation between a subset of socio-emotional skills and crossover women who have had greater exposure to their value chain in the North, but less so in the South. Crossing over is associated with a reduction of 6.5 percentage points in women's self-efficacy for crossover women in the North who have had more than 5 years of experience in the value chain (significant at least at the 5-percent level). Similarly, we find reductions in sociability and networking for crossover women with the most years of experience in the value chain (Q4) in the North. We hypothesize that crossing-over for women in the North comes with having to deviate from constraining norms on gender roles, breaking some ties with the community, therefore weakening their social network, and face challenges and obstacles for which they are less prepared and less supported, thus lowering their self-efficacy, i.e. their belief in their own ability to succeed. By contrast, we find no significant correlation between crossing over and these socio-emotional skills for either women in the South or men in all states (men's outcomes are not shown in the tables). These results suggest that women may face more challenging working environments when crossing over in Northern regions with more restrictive norms on gender roles, altering their self-efficacy and ability to engage in productive interactions. Crossover women with the most exposure to their value chain (Q4_exposure i.e. more than 5 years in a non-poultry sector at the time of the survey) are also found to be less conformist to traditional ways and customs (only significant for women in the South).

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[21] While we regress crossover on a range of socio-emotional skills, we cannot always be sure of the direction of causality and advise that these regression results should be interpreted as correlations. Note that the regressions are run for women only.

5. Conclusion

Occupational choice represents one of the most fundamental decisions farmers and entrepreneurs make, and has been shown as a key driver of the productivity/earnings gap between female-owned and male-owned farms/businesses. Using data from 11,691 applicants to a national agribusiness program in Nigeria, we find there is a large proportion of the sample who chose to go into the poultry value chain despite there being a choice of 11 value chains available in the project. Across the five states, poultry was by far the most popular sector choice (54% on average chose to enter poultry). In all states, except Lagos, a significantly higher proportion of women entered the poultry value chain relative to men. In this paper we look into the reasons why the substantial sorting into poultry might have occurred and why women are more likely to make this choice than men. Among the factors explored, we ask whether the entry into the poultry sector may come from following a norm on what is deemed appropriate for women.

First, we provide evidence that norms around gender roles are more restrictive in the North than in the South and correlate with actual behaviors – more time spent by women on household and care activities, and less time spent on working for pay, outside the home.

Second, we find that norm perception plays an important role in explaining women's sorting into poultry in Northern states. The more women perceive that their community judges women badly for working outside the home, the less likely they are to cross over into higher-return non-poultry sectors. This means that there are perceived social sanctions for a woman deciding to work in certain sectors within communities in the North. In addition, we attribute the gender gap in crossing over largely to differences in work experience especially in agricultural activities and in the chosen value chain, as well as in land ownership, and partly due to differential completion of tertiary-level education.

Third, we find that socio-emotional skills such as personal initiative, perseverance and creativity are positively correlated with crossing over for women with zero experience, reflecting that these skills are likely required for women's decision to enter these higher-return sectors. However, as the number of years of experience in non-traditional crossover sectors increases, we find socio-emotional skills such as self-efficacy and interpersonal network tend to correlate negatively with women crossovers, especially in the North. We hypothesize that this is due to the challenges associated with deviating from traditional gender norms, having to break ties with the community and navigating male-dominated working environments.

While more work is needed to identify the precise causal mechanisms of how intra-household dynamics shape women's occupational choice decision, future research should also examine its implications for socio-emotional skills, especially in contexts with restrictive norms around gender roles. Our results call for interventions that encourage women to enter non-traditional, male-dominated sectors to factor in the underlying norms and skills dynamics at play. Programs that look to encourage the labor supply of women in non-traditional sectors in the context of restrictive norms could consider additional supportive structures that could help cushion any negative backlash from violating those norms.

Promising policies may include support for women who cross over into non-traditional sectors by encouraging network building or increasing their sense of belonging (Das & Kotikula, 2019), increasing exposure to male-dominated trades or directly addressing norms surrounding male-female interactions, and updating any misperceived beliefs on gender norms (Burstzyn et al. 2020). Training on socio-emotional skills may also be effective in encouraging crossing over among those with no exposure to a trade, or supporting women who cross over as they navigate the social ramifications of deviating from norms.

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Table 1 – Descriptive Statistics on Differences between Male and Female Program Applicants

	Full Sample				Northern states				Southern states		
	(1)	(2)	t-test		(3)	(4)	t-test		(5)	(6)	t-test
Variables	Male	Female	Difference		Male	Female	Difference		Male	Female	Difference
Panel A	Mean/SE	Mean/SE	(1)-(2)		Mean/SE	Mean/SE	(3)-(4)		Mean/SE	Mean/SE	(5)-(6)
Demographics											
Age of respondents (years)	31.049	34.111	-3.062***		30.723	33.616	-2.893***		31.654	34.842	-3.188***
	[0.074]	[0.117]			[0.094]	[0.151]			[0.117]	[0.187]	
Household size	8.053	6.980	1.073***		9.711	8.133	1.577***		4.985	5.281	-0.296***
	[0.084]	[0.058]			[0.116]	[0.087]			[0.062]	[0.044]	
Number Children	1.485	2.431	-0.946***		1.809	2.826	-1.018***		0.885	1.847	-0.963***
	[0.035]	[0.029]			[0.051]	[0.042]			[0.029]	[0.034]	
Married Monogamous	0.438	0.571	-0.133***		0.467	0.580	-0.113***		0.384	0.557	-0.173***
	[0.007]	[0.006]			[0.008]	[0.008]			[0.011]	[0.010]	
Married Polygamous	0.033	0.093	-0.060***		0.050	0.143	-0.093***		0.002	0.019	-0.018***
	[0.002]	[0.004]			[0.004]	[0.006]			[0.001]	[0.003]	
Never Married	0.519	0.268	0.250***		0.476	0.216	0.260***		0.597	0.345	0.252***
	[0.007]	[0.006]			[0.008]	[0.007]			[0.011]	[0.009]	
Male Head of household (0/1)	0.940	0.835	0.105***		0.960	0.881	0.079***		0.903	0.767	0.136***
	[0.003]	[0.005]			[0.003]	[0.005]			[0.007]	[0.008]	
Education											
Education: At least Tertiary Level (1/0)	0.683	0.619	0.064***		0.707	0.615	0.091***		0.638	0.624	0.014
	[0.001]	[0.001]			[0.001]	[0.002]			[0.001]	[0.002]	
Work Experience											
Work Experience-Total(years)	7.609	7.470	0.139		7.692	6.886	0.806***		7.456	8.330	-0.874***
	[0.076]	[0.092]			[0.098]	[0.115]			[0.117]	[0.150]	
Work Experience-Value Chain (Years)	4.342	3.642	0.699***		4.479	3.670	0.809***		4.087	3.602	0.485***
	[0.061]	[0.054]			[0.078]	[0.072]			[0.095]	[0.081]	
Worked on own farm in the last 30 days (0/1)	0.472	0.370	0.103***		0.513	0.415	0.098***		0.396	0.302	0.094***
	[0.007]	[0.006]			[0.008]	[0.008]			[0.011]	[0.009]	
Worked on non-farm activities in the last 30 days (0/1)	0.374	0.420	-0.047***		0.365	0.383	-0.018		0.389	0.476	-0.086***
	[0.007]	[0.006]			[0.008]	[0.008]			[0.011]	[0.010]	
Unemployed in the last 30 days (0/1)	0.118	0.153	-0.035***		0.110	0.159	-0.049***		0.132	0.143	-0.011
	[0.004]	[0.005]			[0.005]	[0.006]			[0.008]	[0.007]	

Business, Income and Assets											
Currently own a Business (0/1)	0.582	0.582	-0.000		0.616	0.595	0.021*		0.518	0.562	-0.044***
	[0.007]	[0.006]			[0.008]	[0.008]			[0.011]	[0.010]	
Average Monthly Profits (Inverse Hyperbolic Sine transformation)	6.216	5.922	0.294***		6.536	5.938	0.598***		5.623	5.898	-0.275*
	[0.072]	[0.065]			[0.088]	[0.083]			[0.125]	[0.106]	
Household Average Monthly Income (IHS)	11.177	10.909	0.268***		11.117	10.691	0.426***		11.286	11.229	0.057
	[0.025]	[0.025]			[0.033]	[0.036]			[0.035]	[0.032]	
Household Owns Land (0/1)	0.811	0.783	0.028***		0.830	0.810	0.019**		0.775	0.742	0.033**
	[0.005]	[0.005]			[0.006]	[0.006]			[0.010]	[0.009]	
Norms and Individual Beliefs											
Individual belief-Woman can NOT work (0/1)	0.062	0.026	0.036***		0.079	0.031	0.048***		0.030	0.018	0.012***
	[0.003]	[0.002]			[0.005]	[0.003]			[0.004]	[0.003]	
Perceived community beliefs – speak badly of a woman who works (0 -100)	22.209	15.754	6.455***		26.167	18.395	7.772***		14.880	11.861	3.019***
	[0.318]	[0.258]			[0.435]	[0.381]			[0.362]	[0.289]	
Perceived community beliefs - man is a bad provider if wife working pay (0-100)	21.509	17.245	4.263***		22.754	17.119	5.635***		19.202	17.431	1.771**
	[0.341]	[0.300]			[0.425]	[0.383]			[0.566]	[0.481]	
Decision Making Power on Large Asset											
Self (0/1)	0.410	0.180	0.230***		0.415	0.162	0.253***		0.401	0.206	0.195***
	[0.007]	[0.005]			[0.008]	[0.006]			[0.011]	[0.008]	
Partner - Spouse/Husband	0.124	0.356	-0.232***		0.122	0.398	-0.276***		0.128	0.294	-0.166***
	[0.004]	[0.006]			[0.005]	[0.008]			[0.008]	[0.009]	
Partner jointly (0/1)	0.134	0.249	-0.114***		0.117	0.250	-0.133***		0.166	0.247	-0.080***
	[0.005]	[0.005]			[0.005]	[0.007]			[0.009]	[0.009]	
Other relative male (0/1)	0.258	0.151	0.107***		0.299	0.147	0.152***		0.182	0.157	0.026**
	[0.006]	[0.005]			[0.008]	[0.006]			[0.009]	[0.007]	
Reason for choosing value chain											
Saw a good business opportunity to make money (1/0)	0.229	0.242	-0.013*		0.253	0.272	-0.019*		0.184	0.197	-0.013
	[0.006]	[0.005]			[0.007]	[0.007]			[0.009]	[0.008]	
To pursue an interest/hobby/passion (1/0)	0.255	0.343	-0.088***		0.204	0.307	-0.102***		0.349	0.396	-0.048***
	[0.006]	[0.006]			[0.007]	[0.008]			[0.011]	[0.010]	
Had experience with this value chain (1/0)	0.450	0.360	0.090***		0.470	0.355	0.115***		0.413	0.366	0.047***
	[0.007]	[0.006]			[0.008]	[0.008]			[0.011]	[0.010]	
Observations	5469	6222			3551	3707			1918	2515	

Panel B									
Socio-Emotional Skills									
Personal Initiative Index	4.286	4.267	0.019*		4.275	4.247	0.029**	4.311	4.303	0.008
	[0.007]	[0.007]			[0.009]	[0.009]		[0.012]	[0.011]	
Self-Efficacy Index	4.362	4.339	0.023**		4.359	4.321	0.038***	4.371	4.373	-0.003
	[0.007]	[0.007]			[0.009]	[0.008]		[0.012]	[0.011]	
Interpersonal Sociable	4.286	4.249	0.037**		4.264	4.206	0.058***	4.336	4.327	0.009
	[0.012]	[0.011]			[0.014]	[0.013]		[0.020]	[0.018]	
Interpersonal Network	4.339	4.279	0.060***		4.344	4.285	0.060***	4.327	4.268	0.059**
	[0.011]	[0.010]			[0.013]	[0.012]		[0.019]	[0.017]	
Conformity	2.504	2.575	-0.070**		2.490	2.579	-0.089**	2.537	2.566	-0.029
	[0.021]	[0.020]			[0.026]	[0.026]		[0.035]	[0.031]	
Observations	3020	3573			2100	2307		920	1266	

Notes: The value displayed for t-tests are the differences in the means across the groups.

***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table 1 provides a summary of key variables from the listing data collected from 11,691 shortlisted APPEALS applicants in five states: Lagos, Cross River, Kano, Kaduna and Kogi states in Nigeria. The mean levels for male (column (1)) and female (column (2)) applicants are shown in the table with a t-test for the differences between genders. The North subgroup includes Kano, Kaduna and Kogi states; and the South subgroup includes Lagos and Cross River states. Variables in Panel A were collected from the full sample of 11,691 applicants.

The socio-emotional skills variables in Panel B were collected from a randomized subsample of 50% of applicants stratified by the gender and state of the applicant.

Table 2 – Value Chain Choice: Differences between Male and Female Program Applicants

Value Chain Choices	Full Sample				Northern states				Southern states		
	(1)	(2)	t-test		(3)	(4)	t-test		(5)	(6)	t-test
	Male	Female	Difference		Male	Female	Difference		Male	Female	Difference
	Mean/SE	Mean/SE	(1)-(2)		Mean/SE	Mean/SE	(3)-(4)		Mean/SE	Mean/SE	(5)-(6)
Aquaculture (0/1)	0.116	0.128	-0.012*		0.074	0.083	-0.008		0.193	0.194	-0.000
	[0.004]	[0.004]			[0.004]	[0.005]			[0.009]	[0.008]	
Cashew (0/1)	0.012	0.011	0.001		0.018	0.018	0.000		0.001	0.000	0.001
	[0.001]	[0.001]			[0.002]	[0.002]			[0.001]	[0.000]	
Cassava (0/1)	0.107	0.123	-0.015***		0.113	0.121	-0.007		0.096	0.126	-0.030***
	[0.004]	[0.004]			[0.005]	[0.005]			[0.007]	[0.007]	
Cocoa (0/1)	0.038	0.022	0.016***		0.001	0.001	0.000		0.108	0.054	0.054***
	[0.003]	[0.002]			[0.000]	[0.000]			[0.007]	[0.005]	
Dairy (0/1)	0.054	0.033	0.021***		0.083	0.055	0.028***		0.001	0.000	0.000
	[0.003]	[0.002]			[0.005]	[0.004]			[0.001]	[0.000]	
Ginger (0/1)	0.010	0.008	0.001		0.014	0.012	0.002		0.002	0.002	-0.000
	[0.001]	[0.001]			[0.002]	[0.002]			[0.001]	[0.001]	
Maize (0/1)	0.045	0.026	0.019***		0.061	0.036	0.026***		0.016	0.012	0.004
	[0.003]	[0.002]			[0.004]	[0.003]			[0.003]	[0.002]	
Poultry (0/1)	0.511	0.566	-0.055***		0.530	0.602	-0.072***		0.477	0.513	-0.036**
	[0.007]	[0.006]			[0.008]	[0.008]			[0.011]	[0.010]	
Rice (0/1)	0.096	0.076	0.020***		0.090	0.062	0.029***		0.106	0.097	0.009
	[0.004]	[0.003]			[0.005]	[0.004]			[0.007]	[0.006]	
Tomatoes (0/1)	0.009	0.006	0.003*		0.014	0.009	0.005*		0.001	0.002	-0.001
	[0.001]	[0.001]			[0.002]	[0.002]			[0.001]	[0.001]	
Segment - Production(0/1)	0.816	0.750	0.066***		0.852	0.833	0.019**		0.750	0.628	0.122***
	[0.005]	[0.005]			[0.006]	[0.006]			[0.010]	[0.010]	
Segment - Processing(0/1)	0.103	0.116	-0.012**		0.085	0.089	-0.004		0.138	0.155	-0.017
	[0.004]	[0.004]			[0.005]	[0.005]			[0.008]	[0.007]	
Segment - Marketing(0/1)	0.080	0.134	-0.054***		0.063	0.077	-0.015**		0.112	0.217	-0.105***
	[0.004]	[0.004]			[0.004]	[0.004]			[0.007]	[0.008]	
Observations	5469	6222			3551	3707			1918	2515	

The value displayed for t-tests are the differences in the means across the groups.

***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table 3a – WOMEN SAMPLE: Gender Norms and Behaviors by Region

WOMEN ONLY	Hours spent on working for pay on a typical day (0-24)	Hours spent on household chores on a typical day (0-24)	Hours spent on care activities on a typical day (0-24)	Woman is included in household decisions about money spending priorities solely or jointly (0-1)	Frequency with which speaks with a partner regarding employment or business (1-5 where 1 is never and 5 is very often)	Business located at home as usual (0-1)
	(1)	(2)	(3)	(4)	(5)	(6)
Norm (Share Judges Women Badly)	-0.0122***	0.0102*	0.00881**	-0.000526	-0.00466***	0.00254***
	(0.00271)	(0.00526)	(0.00397)	(0.000609)	(0.00103)	(0.000426)
South	0.935***	-1.781***	-1.380***	0.125***	0.346***	-0.150***
	(0.238)	(0.244)	(0.207)	(0.0298)	(0.0654)	(0.0492)
South*Norm (Share Judges Women Badly)	0.00836	-0.0178**	-0.0145**	-0.000828	0.00244	-0.00413***
	(0.00697)	(0.00793)	(0.00620)	(0.000934)	(0.00200)	(0.00111)
Mean for Northern Women Norm = Zero Share Judges Women	6.312	7.543	4.638	0.476	4.532	0.542
	(0.177)	(0.110)	(0.110)	(0.0214)	(0.0615)	(0.0291)
Observations	3246	3246	3246	3246	2670	2592
adj. R-sq	0.033	0.054	0.049	0.015	0.053	0.058
Estimate norm+south*norm	-0.00379	-0.00758	-0.00569	-0.00135	-0.00221	-0.00160
p-value norm+south*norm	0.556	0.204	0.235	0.0582	0.200	0.120

Notes: *** p<0.01, ** p<0.05, * p<0.1
OLS regression where we include attitudes and behavioral outcomes measured during the baseline survey for the APPEALS impact evaluation. Sample includes only a subsample of applicants who were successful APPEALS WYEP beneficiaries. Explanatory variables are Perceived Community Norm i.e. the proportion of the community that judges a woman badly for working outside of the home (0-100%); and a dummy for region where 1 = South and 0 = North.

Table 3b – MEN SAMPLE: Gender Norms and Behaviors by Region

MEN ONLY	Hours spent on working for pay on a typical day (0-24)	Hours spent on household chores on a typical day (0-24)	Hours spent on care activities on a typical day (0-24)	Woman is included in household decisions about money spending priorities solely or jointly (0-1)	Frequency with which speaks with a partner regarding employment or business (1-5 where 1 is never and 5 is very often)	Business located at home as usual (0-1)
	(1)	(2)	(3)	(4)	(5)	(6)
Norm (Share Judges Men Badly)	0.00200	0.000422	0.00276	-0.00192***	-0.00213**	0.000325
	(0.00227)	(0.00221)	(0.00192)	(0.000585)	(0.00102)	(0.000488)
South	0.216	-0.511***	-0.636***	0.0204	0.267***	0.00910
	(0.213)	(0.177)	(0.153)	(0.0397)	(0.0600)	(0.0282)
South*Norm (Share Judges Men Badly)	-0.00472	0.00303	0.00138	0.00225***	0.00342***	-0.0000235
	(0.00427)	(0.00338)	(0.00310)	(0.000740)	(0.00119)	(0.000708)
Mean for Northern Men Norm = Zero Share Judges Men	7.018	5.761	3.692	0.674	4.484	0.334
	(0.266)	(0.144)	(0.131)	(0.0238)	(0.0437)	(0.0251)
N	2716	2716	2716	2716	2241	2106
adj. R-sq	-0.000	0.004	0.012	0.010	0.034	-0.001
Estimate norm+south*norm	-0.00272	0.00345	0.00413	0.000334	0.00129	0.000301
p-value norm+south*norm	0.453	0.179	0.0921	0.461	0.0396	0.558

Notes: *** p<0.01, ** p<0.05, * p<0.1
OLS regression among men where we include attitudes and behavioral outcomes measured during the baseline survey for the APPEALS impact evaluation.
Sample includes only a subsample of applicants who were successful APPEALS WYEP beneficiaries. Explanatory variables are Perceived Community Norm i.e. the proportion of the community that judges a man badly if his wife is for working outside of the home (0-100%); and a dummy for region where 1 = South and 0 = North.

Table 4 – what predicts crossing over into a non-poultry sector? Sequential regression

Full Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
	Crossover	Crossover	Crossover	Crossover	Crossover	Crossover	Crossover	*Correlates for men (X + Male*X)*
Male (0/1)	0.055***	0.058***	0.049***	0.054***	0.026	-0.071***	-0.046	
	(0.014)	(0.014)	(0.016)	(0.017)	(0.024)	(0.025)	(0.028)	
Individual belief-Woman cannot work out of home (0/1)			-0.059	-0.058	-0.058	-0.053	-0.050	
			(0.039)	(0.039)	(0.039)	(0.041)	(0.041)	
*Individual belief-Woman cannot work out of home*male*			0.046	0.045	0.048	0.044	0.042	-0.0080
			(0.046)	(0.046)	(0.046)	(0.046)	(0.047)	(0.0236)
Perceived community norm – judges a woman/man badly (0 -100)			-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
*Perceived community norm – judges a woman/man badly*male*			0.001*	0.001*	0.001**	0.001**	0.001*	-0.0002
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0003)
Business Opportunity (1/0)				0.017	0.017	0.040***	0.042***	
				(0.015)	(0.015)	(0.015)	(0.015)	
Business Opportunity*male				-0.024	-0.023	0.002	-0.000	0.0421**
				(0.018)	(0.018)	(0.019)	(0.019)	(0.0194)
Minimum Tertiary Edu.(0/1)					-0.000	0.005	0.004	
					(0.014)	(0.013)	(0.013)	
*Minimum Tertiary Edu*male*					0.038	0.024	0.024	0.0275
					(0.025)	(0.023)	(0.023)	(0.0173)
Work Experience in Value Chain (years)						0.017***	0.017***	
						(0.004)	(0.004)	
*Work Experience in Value Chain*male*						0.010***	0.010***	0.0272***
						(0.003)	(0.003)	(0.0023)
Worked on own farm in the last 30 days (0/1)						0.037**	0.032**	
						(0.016)	(0.016)	
*Worked on own farm in the last 30 days*male*						0.085***	0.089***	0.1206***
						(0.019)	(0.019)	(0.0175)
Worked on non-farm activities in the last 30 days (0/1)						0.031**	0.028**	
						(0.013)	(0.013)	
*Worked on non-farm activities in the last 30 days*male*						-0.017	-0.014	0.0138
						(0.021)	(0.021)	(0.0180)
Household Owns Land (0/1)							0.050***	
							(0.011)	
*Household Owns Land*male*							-0.036	0.0138
							(0.023)	(0.0188)
Constant	0.434***	0.451***	0.475***	0.470***	0.479***	0.539***	0.510***	
	(0.020)	(0.060)	(0.056)	(0.057)	(0.058)	(0.056)	(0.057)	
Observations	11,691	11,691	11,691	11,691	11,691	11,691	11,691	
R-squared	0.003	0.008	0.010	0.010	0.011	0.062	0.063	
Controls	No	Yes	Yes	Yes	Yes	Yes	Yes	

Notes: *** p<0.01, ** p<0.05, * p<0.1
OLS regression dependent variable is Crossover equal to 1 if applicants chose any value chain that is different from the popular one (poultry) and 0 if poultry. Explanatory variables include gender i.e. a dummy variable if respondent is male and its interaction with a set of explanatory factors. Explanatory factors are sequentially added to the regression, grouped into the following themes: gender (column 1), norms (column 2), opportunity entrepreneur (column 3), education (column 4), work experience (column 5), types of work (column 6), and land ownership (column 7). Columns (1)-(7) regressions include the full sample. See Tables 4a and 4b for regressions restricting the sample to North only and South only.
Control variables include demographic characteristics of the applicants: household size, age of applicants, number of children, marital status, decision-making and household monthly income.

Table 4a – NORTH what predicts crossing over into a non-poultry sector? Sequential regression

Northern states

	(1) Crossover	(2) Crossover	(3) Crossover	(4) Crossover	(5) Crossover	(6) Crossover	(7) Crossover	Correlates for men (X + Male*X)
Male (0/1)	0.072***	0.088***	0.075***	0.086***	0.026	-0.067**	-0.038	
	(0.019)	(0.018)	(0.020)	(0.021)	(0.035)	(0.033)	(0.042)	
Individual belief-Woman cannot work out of the home (0/1)			-0.056	-0.053	-0.053	-0.046	-0.041	
			(0.042)	(0.043)	(0.043)	(0.043)	(0.044)	
Individual belief-Woman cannot work out of the home*male			0.036	0.033	0.039	0.041	0.036	-0.0049
			(0.048)	(0.048)	(0.048)	(0.050)	(0.050)	(0.0269)
Perceived community norm – judges a woman/man badly (0 -100)			-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Perceived community norm – judges a woman/man badly*male			0.001*	0.001**	0.001**	0.001**	0.001**	-0.0002
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0003)
Business Opportunity (1/0)				0.046***	0.045***	0.072***	0.076***	
				(0.016)	(0.016)	(0.016)	(0.016)	
Business Opportunity*male				-0.045**	-0.042*	-0.008	-0.010	0.0658***
				(0.022)	(0.021)	(0.023)	(0.023)	(0.0214)
Minimum Tertiary Edu.(0/1)					-0.015	-0.011	-0.013	
					(0.017)	(0.016)	(0.016)	
Minimum Tertiary Edu*male					0.079***	0.061**	0.062**	0.0496**
					(0.029)	(0.026)	(0.026)	(0.0191)
Work Experience in Value Chain (years)						0.013***	0.013***	
						(0.004)	(0.004)	
Work Experience in Value Chain*male						0.015***	0.015***	0.0275***
						(0.003)	(0.003)	(0.0027)
Worked on own farm in the last 30 days (0/1)						0.088***	0.082***	
						(0.016)	(0.016)	
Worked on own farm in the last 30 days*male						0.040*	0.044*	0.1261***
						(0.023)	(0.023)	(0.0216)
Worked on non-farm activities in the last 30 days (0/1)						0.060***	0.056***	
						(0.014)	(0.015)	
Worked on non-farm activities in the last 30 days*male						-0.053**	-0.049*	0.0069
						(0.026)	(0.027)	(0.0206)
Household Owns Land (0/1)							0.054***	
							(0.014)	
Household Owns Land*male							-0.040	0.0144
							(0.031)	(0.0257)
Constant	0.398***	0.349***	0.378***	0.360***	0.378***	0.435***	0.401***	
	(0.030)	(0.075)	(0.073)	(0.071)	(0.074)	(0.069)	(0.070)	
Observations	7,258	7,258	7,258	7,258	7,258	7,258	7,258	
R-squared	0.005	0.015	0.018	0.019	0.020	0.076	0.077	
Controls	No	Yes	Yes	Yes	Yes	Yes	Yes	

Notes: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

OLS regression dependent variable is Crossover equal to 1 if applicants chose any value chain that is different from the popular one (poultry) and 0 if poultry. Columns (1)-(7) regressions include the results for North only.

Control variables include demographic characteristics of the applicants: household size, age of applicants, number of children, marital status, decision-making and household monthly income.

Table 4b – SOUTH what predicts crossing over into a non-poultry sector? Sequential regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Correlates for men (X + Male*X)
	Crossover	Crossover	Crossover	Crossover	Crossover	Crossover	Crossover	
Male (0/1)	0.036*	0.028	0.036	0.035	0.050	-0.047	-0.022	
	(0.019)	(0.023)	(0.025)	(0.027)	(0.032)	(0.042)	(0.037)	
Individual belief-Woman cannot work out of the home (0/1)			-0.015	-0.017	-0.019	-0.030	-0.032	
			(0.082)	(0.080)	(0.080)	(0.084)	(0.085)	
*Individual belief-Woman cannot work out of the home*male*			0.118	0.119	0.121	0.101	0.103	0.0710
			(0.107)	(0.105)	(0.106)	(0.105)	(0.106)	(0.0483)
Perceived community norm – judges a woman/man badly (0 -100)			0.001	0.001	0.001	0.001	0.001	
			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
*Perceived community norm – judges a woman/man badly*male*			-0.001	-0.001	-0.001	-0.001	-0.001	-0.0001
			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.0007)
Business Opportunity (1/0)				-0.023	-0.023	-0.005	-0.003	
				(0.018)	(0.018)	(0.019)	(0.019)	
Business Opportunity*male				0.007	0.007	0.007	0.005	0.0018
				(0.035)	(0.035)	(0.032)	(0.032)	(0.0253)
Minimum Tertiary Edu.(0/1)					0.024	0.034**	0.034**	
					(0.018)	(0.016)	(0.016)	
*Minimum Tertiary Edu*male*					-0.023	-0.029	-0.029	0.0048
					(0.029)	(0.029)	(0.029)	(0.0261)
Work Experience in Value Chain (years)						0.022***	0.021***	
						(0.007)	(0.007)	
*Work Experience in Value Chain*male*						0.003	0.003	0.0247***
						(0.004)	(0.004)	(0.0043)
Worked on own farm in the last 30 days (0/1)						-0.013	-0.016	
						(0.016)	(0.015)	
*Worked on own farm in the last 30 days*male*						0.130***	0.133***	0.1167***
						(0.027)	(0.028)	(0.0296)
Worked on non-farm activities in the last 30 days (0/1)						0.001	-0.000	
						(0.027)	(0.027)	
*Worked on non-farm activities in the last 30 days*male*						0.039	0.041	0.0405
						(0.028)	(0.028)	(0.0348)
Household Owns Land (0/1)							0.048***	
							(0.016)	
*Household Owns Land*male*							-0.039	0.0087
							(0.038)	(0.0311)
Constant	0.487***	0.564***	0.549***	0.553***	0.544***	0.615***	0.596***	
	(0.017)	(0.051)	(0.050)	(0.051)	(0.052)	(0.054)	(0.054)	
Observations	4,433	4,433	4,433	4,433	4,433	4,433	4,433	
R-squared	0.001	0.016	0.017	0.018	0.018	0.061	0.062	
Controls	No	Yes	Yes	Yes	Yes	Yes	Yes	

Notes: *** p<0.01, ** p<0.05, * p<0.1

OLS regression dependent variable is Crossover equal to 1 if applicants chose any value chain that is different from the popular one (poultry) and 0 if poultry. Columns (1)-(7) regressions include the results for South only.

Control variables include demographic characteristics of the applicants: household size, age of applicants, number of children, marital status, decision-making and household monthly income.

Table 5: Socio-emotional Skills and Exposure to Non-Poultry Crossover Sectors

FULL SAMPLE WOMEN ONLY	Personal Initiative Index (0-5)	Self-Efficacy Index (0-5)	Perseverance Index (0-5)	Interpersonal Sociable (0-5)	Interpersonal Network (0-5)	Creativity (0-5)	Conformity (0-5)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q2_exposure	0.0413	0.0271	0.0205	-0.0293	0.0469	0.0636	-0.0623
	(0.0299)	(0.0250)	(0.0290)	(0.0435)	(0.0315)	(0.0387)	(0.0687)
Q3_exposure	0.0648**	0.0107	0.0630**	-0.0143	0.0816**	0.0656*	-0.0224
	(0.0259)	(0.0271)	(0.0282)	(0.0407)	(0.0384)	(0.0346)	(0.0854)
Q4_exposure	0.0444	0.0123	0.0710***	-0.0269	0.0494	0.00895	0.0204
	(0.0306)	(0.0266)	(0.0245)	(0.0563)	(0.0393)	(0.0414)	(0.0989)
Crossover (0 years)	0.0671*	-0.00217	0.0509	-0.0177	-0.00531	0.0390	0.0972
	(0.0348)	(0.0269)	(0.0342)	(0.0512)	(0.0408)	(0.0380)	(0.0850)
Crossover*Q2_exposure (1-2yrs)	0.0129	-0.0305	0.0124	0.0247	0.00665	-0.0393	0.0720
	(0.0230)	(0.0271)	(0.0213)	(0.0543)	(0.0293)	(0.0279)	(0.0713)
Crossover*Q3_exposure (3-5yrs)	-0.0116	-0.0305*	-0.0542**	-0.00766	-0.0933**	-0.0298	-0.0274
	(0.0212)	(0.0178)	(0.0272)	(0.0346)	(0.0379)	(0.0320)	(0.0634)
Crossover*Q4_exposure (more than 5 yrs)	-0.0539**	-0.0768***	-0.0909***	-0.0500	-0.0854*	-0.00768	-0.196**
	(0.0251)	(0.0290)	(0.0253)	(0.0455)	(0.0450)	(0.0354)	(0.0921)
Constant (Q1_exposure Poultry (0 years))	4.033***	4.183***	4.178***	4.165***	4.052***	4.253***	1.881***
	(0.0546)	(0.0639)	(0.0564)	(0.0719)	(0.0631)	(0.0594)	(0.137)
Observations	3573	3573	3573	3573	3573	3573	3573
adj. R-sq	0.014	0.010	0.007	0.009	0.010	0.001	0.010
Estimate Q4_exposure + Crossover*Q4_exposure	-0.00945	-0.0645	-0.0198	-0.0769	-0.0360	0.00127	-0.175
p-value Q4_exposure + Crossover*Q4_exposure	0.723	0.0180	0.498	0.173	0.387	0.971	0.0265

Notes: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

OLS regression: dependent variables are a set of socio-emotional skills variables (see Appendix A3 for the statements used to create each index). Explanatory variables include crossover equal to 1 if applicants chose any value chain that is different from the popular one (poultry) and 0 if poultry; and quartiles of exposure to the value chain which was created using the number of years of experience in the value chain. Quartiles for exposure: Q1 = 0 years of experience in value chain; Q2 = 1-2 years; Q3 = 3-5 years and Q4 = more than 5 years. Control variables include demographic characteristics of the applicants: household size, age of applicants, number of children, marital status, decision-making and household monthly income.

Table 5a – NORTH Socio-emotional Skills and Exposure to Non-Poultry Crossover Sectors

NORTHERN WOMEN ONLY	Personal Initiative Index (0-5)	Self-Efficacy Index (0-5)	Perseverance Index (0-5)	Interpersonal Sociable (0-5)	Interpersonal Network (0-5)	Creativity (0-5)	Conformity (0-5)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q2_exposure	0.0363	0.0193	-0.0105	-0.0338	0.0288	0.0858**	-0.122
	(0.0396)	(0.0327)	(0.0355)	(0.0531)	(0.0342)	(0.0391)	(0.0872)
Q3_exposure	0.0465	-0.00140	0.0608	-0.0203	0.0319	0.0722	0.0716
	(0.0341)	(0.0367)	(0.0374)	(0.0486)	(0.0419)	(0.0456)	(0.102)
Q4_exposure	0.0253	0.0108	0.0637**	-0.0163	0.0443	0.0480	0.0818
	(0.0374)	(0.0329)	(0.0304)	(0.0558)	(0.0402)	(0.0491)	(0.114)
Crossover	0.0190	-0.0213	0.00571	-0.0551	-0.0252	0.000712	0.145
	(0.0454)	(0.0362)	(0.0429)	(0.0626)	(0.0414)	(0.0495)	(0.105)
Crossover*Q2_exposure	-0.00194	-0.0708**	0.00764	-0.0432	-0.0239	-0.0491	0.137
	(0.0335)	(0.0272)	(0.0282)	(0.0424)	(0.0338)	(0.0299)	(0.102)
Crossover*Q3_exposure	-0.00647	-0.0242	-0.0570*	-0.0300	-0.0906*	-0.0144	-0.119
	(0.0240)	(0.0222)	(0.0308)	(0.0498)	(0.0524)	(0.0326)	(0.0783)
Crossover*Q4_exposure	-0.0417	-0.0807***	-0.0922***	-0.106*	-0.119**	-0.0501	-0.133
	(0.0294)	(0.0285)	(0.0308)	(0.0563)	(0.0560)	(0.0355)	(0.104)
Constant (Q1_exposure Poultry (0 years))	4.078***	4.220***	4.194***	4.162***	4.160***	4.294***	2.108***
	(0.0574)	(0.0737)	(0.0662)	(0.0756)	(0.0620)	(0.0740)	(0.184)
Observations	2307	2307	2307	2307	2307	2307	2307
adj. R-sq	0.012	0.008	0.010	0.005	0.008	0.002	0.004
Estimate Q4_exposure + Crossover*Q4_exposure	-0.0163	-0.0699	-0.0285	-0.122	-0.0748	-0.00209	-0.0513
p-value Q4_exposure + Crossover*Q4_exposure	0.621	0.0405	0.456	0.0408	0.187	0.964	0.593

Notes: *** p<0.01, ** p<0.05, * p<0.1
OLS regression: dependent variables are a set of socio-emotional skills variables (see Appendix A3 for the statements used to create each index). Explanatory variables include crossover equal to 1 if applicants chose any value chain that is different from the popular one (poultry) and 0 if poultry; and quartiles of exposure to the value chain which was created using the number of years of experience in the value chain. Quartiles for exposure: Q1 = 0 years of experience in value chain; Q2 = 1-2 years; Q3 = 3-5 years and Q4 = more than 5 years.
Sample is restricted to women in Northern states only.
Control variables include demographic characteristics of the applicants: household size, age of applicants, number of children, marital status, decision-making and household monthly income.

Table 5b – SOUTH Socio-emotional Skills and Exposure to Non-Poultry Crossover Sectors

SOUTHERN WOMEN ONLY	Personal Initiative Index (0-5)	Self-Efficacy Index (0-5)	Perseverance Index (0-5)	Interpersonal Sociable (0-5)	Interpersonal Network (0-5)	Creativity (0-5)	Conformity (0-5)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Q2_exposure	0.0604	0.0461	0.0814**	-0.0273	0.0815	0.0229	0.114
	(0.0427)	(0.0382)	(0.0363)	(0.0672)	(0.0638)	(0.0886)	(0.121)
Q3_exposure	0.117***	0.0451	0.0703**	-0.00263	0.181***	0.0583	-0.153
	(0.0321)	(0.0285)	(0.0346)	(0.0599)	(0.0516)	(0.0462)	(0.115)
Q4_exposure	0.0958*	0.0247	0.0781*	-0.0646	0.0373	-0.0780	-0.0234
	(0.0472)	(0.0501)	(0.0411)	(0.136)	(0.0930)	(0.0792)	(0.192)
Crossover	0.153***	0.0316	0.132***	0.0361	0.0435	0.113*	0.0468
	(0.0442)	(0.0302)	(0.0363)	(0.0673)	(0.0911)	(0.0574)	(0.135)
Crossover*Q2_exposure	0.0308	0.0151	0.00467	0.0956	0.0576	-0.00689	-0.0481
	(0.0273)	(0.0375)	(0.0327)	(0.0784)	(0.0489)	(0.0616)	(0.0865)
Crossover*Q3_exposure	-0.0369	-0.0526	-0.0566	-0.00338	-0.111**	-0.0456	0.201**
	(0.0440)	(0.0328)	(0.0522)	(0.0480)	(0.0505)	(0.0668)	(0.0948)
Crossover*Q4_exposure	-0.0859**	-0.0723	-0.0860*	0.0371	-0.00751	0.105	-0.255
	(0.0405)	(0.0695)	(0.0488)	(0.0952)	(0.0894)	(0.0819)	(0.168)
Constant (Q1_exposure Poultry (0 years))	3.892***	4.097***	4.138***	4.122***	3.709***	4.189***	1.346***
	(0.142)	(0.112)	(0.0891)	(0.179)	(0.154)	(0.123)	(0.202)
Observations	1266	1266	1266	1266	1266	1266	1266
adj. R-sq	0.017	0.007	0.005	0.015	0.013	-0.002	0.047
Estimate Q4_exposure + Crossover*Q4_exposure	0.00988	-0.0477	-0.00788	-0.0276	0.0298	0.0270	-0.278
p-value Q4_exposure + Crossover*Q4_exposure	0.817	0.221	0.850	0.778	0.651	0.535	0.0141

Notes: *** p<0.01, ** p<0.05, * p<0.1
OLS regression: dependent variables are a set of socio-emotional skills variables (see Appendix A3 for the statements used to create each index). Explanatory variables include crossover equal to 1 if applicants chose any value chain that is different from the popular one (poultry) and 0 if poultry; and quartiles of exposure to the value chain which was created using the number of years of experience in the value chain. Quartiles for exposure: Q1 = 0 years of experience in value chain; Q2 = 1-2 years; Q3 = 3-5 years and Q4 = more than 5 years.
Sample is restricted to women in Southern states only.
Control variables include demographic characteristics of the applicants: household size, age of applicants, number of children, marital status, decision-making and household monthly income.

Appendix A1: Top Value Chains Selected by Applicants to the Project

Top value chains selected among the APPEALS WYEP applicants across the 5 states (only value chains where at least 5% in the state selected the value chain are shown in the Table 6). The table shows that poultry is the top value chain chosen by both men and women in all 5 states covered by the project. In all states, except Lagos, we find that women were significantly more likely to enter into the poultry value chain than men.

Table 6: Top Crops by State Chosen by APPEALS WYEP Project Applicants

		Top Crops (at least 5% chose the crop)	All		Male		Female	
South	Lagos	Aquaculture (0/1)	1803	31%	733	32%	1070	31%
		Poultry (0/1)	1803	59%	733	61%	1070	57%
		Rice (0/1)	1803	10%	733	7%	1070	12%
North	Kaduna	Dairy (0/1)	2588	12%	1194	16%	1394	9%
		Maize (0/1)	2588	11%	1194	15%	1394	7%
		Poultry (0/1)	2588	58%	1194	49%	1394	66%
North	Kano	Aquaculture (0/1)	2066	6%	1242	6%	824	6%
		Dairy (0/1)	2066	9%	1242	8%	824	10%
		Poultry (0/1)	2066	72%	1242	71%	824	75%
		Rice (0/1)	2066	10%	1242	12%	824	7%
North	Kogi	Aquaculture (0/1)	2605	8%	1115	9%	1489	8%
		Cashew (0/1)	2605	5%	1115	6%	1489	4%
		Cassava (0/1)	2605	32%	1115	35%	1489	30%
		Poultry (0/1)	2605	43%	1115	37%	1489	47%
South	Cross River	Aquaculture (0/1)	2630	11%	1185	12%	1445	11%
		Cassava (0/1)	2630	19%	1185	16%	1445	22%
		Cocoa (0/1)	2630	13%	1185	18%	1445	9%
		Poultry (0/1)	2630	44%	1185	40%	1445	47%
		Rice (0/1)	2630	10%	1185	13%	1445	8%

Note: Tomatoes, ginger, and wheat are not mentioned in Table 6 since less than 5% chose that particular value chain within each of the states. However, all 11 value chains were available to be chosen in every state included in the APPEALS WYEP program.

Appendix A2: The Relative Economic Returns to Poultry

In the following analysis we estimate the relative profitability of the value chains offered in the WYEP APPEALS program by utilizing an agriculture survey collected by the APPEALS project team in 2019 from small- and medium-scale farmers prior to the rollout of the interventions. This data was collected from farmers to establish a benchmark on which to measure project implementation progress and included measures of agricultural production and productivity, farming techniques used and level of access to markets by farmers in the project locations.[22] Modules on agricultural crops, poultry and aquaculture were administered separately to the farmers. We use detailed information collected on revenues earned per value chain in the 2018 agricultural seasons and subtract the total costs paid in 2018 to estimate the profitability of

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[22] The survey was conducted by the APPEALS project team in collaboration with the World Bank who contracted IFPRI to collect the data in September 2019.

each of the value chains included in the survey. The profile of farmers interviewed are somewhat more established than those targeted for the WYEP component of the APPEALS projects. A comparison of the WYEP sample and the farmers surveyed, suggests that, on average, the farmers in the APPEALS project's agriculture survey are approximately ten years older than the WYEP APPEALS target sample and therefore the estimates come from older, more experienced farmers. Therefore, while these profit estimates are useful to compare relative profitability of the value chains within our study sample we caution that they may not reflect the actual profit potential of a WYEP APPEALS agribusiness owner when they enter the program.

Table 7: Estimated Relative Profitability of Main Value Chains in the APPEALS Program

Value Chain	**Annualized Profits in 2018 (Value in Nigerian naira)**	**Annualized Profits in 2018 (Value in US Dollars)**	**Number of Observations**
Rice	1679656	$4,608.11	598
Maize	621151.2	$1,704.12	265
Wheat	1187506	$3,257.90	81
Cassava	342796.8	$940.46	129
Tomatoes	2491241	$6,834.68	72
Ginger	1486658	$4,078.62	130
Poultry	400567.40	$1,098.95	399
Aquaculture	344066.80	$943.94	184

Notes: The mean of the 2018 annualized profits for each value chain is reported in the table. All profit values are winsorized at 99th percentile. USD profitability is calculated using the 2018 market exchange rate: NGN 364.5 to 1 USD. The value chains included in Table 7 are all those for which there is data available.
(1) Crops - prices used in the revenues estimate are imputed from the median price of the crop per kg within each value chain. The total revenues are calculated by multiplying the quantity of sales per kg in the 2018 production season by the median price per kg in the data. In the costs estimate the labor costs are reported for 2018 but are divided into harvest and production.
(2) Poultry - revenues aggregated from sale of birds, processed poultry products, by-products and eggs. Costs are aggregated across all bird products per production cycle. The cost estimate does not include the cost of birds purchased in 2018 since only prices of a day old chick were included in the data and total quantity of birds purchased in 2018 was missing. This omission may underestimate the costs in poultry and therefore slightly overestimate the profits in poultry.
(3) Aquaculture - costs were estimated per production cycle so I multiply the variable costs by average number of cycles across all fish products. The highest costs for aquaculture value chain is in feeding.
(4) Median Crop Prices in NGN Per Kg: Rice 130, Maize 75, Wheat 160, Cassava 24, Tomatoes 40, Ginger 125. Median Price Per Bird: 1911 (Chicken Locals) / 1360 (Chicken Layer) / 2480 (Chicken Broiler) / 2560 (Cockrel). Median Price Per Kg Fish: 700 (Catfish Clarias gariepinus kg).
(5) Number of production cycles in 2018 estimated by 12 months divided by reported "number of months it takes the crop to get to maturity"

In Table 7 we present the profits for the farmers in the sample annualized for 2018 in Nigerian Naira and USD based on 2018 market exchange rates. The annualized profits are estimated by calculating revenues minus costs, and Table 7 presents the average annual profits in 2018 by value chain. We use these results to determine the relative competitiveness or economic returns of the major value chains supported by the APPEALS program. The analysis suggests that the value chains on offer by the program are on average all profitable. However, Table 7 shows that while poultry is a profitable option, it is not the most economically competitive relative to the other value chains analyzed. The profitability of poultry agribusinesses in our sample in 2018 is similar to the cassava and aquaculture value chains but earns less than some of the other value chains offered by the WYEP APPEALS program.

These results validate that there are some other reasons why people (especially women) go into the poultry sector. The WYEP component of the APPEALS program targets younger farmers and women and perhaps this target group are attracted to enterprises that do not require a lot of land (because they face challenges accessing land), generate returns quickly (short cycles), and can provide full employment as opposed to seasonal production. In this paper, we also show that gender norms around work influence the sectoral choice decision for women entrepreneurs.

Further details on the approach to estimate annualized profits are described below. First, revenues are calculated by the quantity in kilograms produced in 2018 multiplied the median price per kilogram per value chain in the data. The median prices assumed in the data were compared to the average annual commodity crop prices per kilogram from data collated by Nigeria National Agricultural Extension and Research Liaison Services (NAERLS) and the price estimates from the data

are comparable to 2018 Nigerian crop prices (NAERLS, 2018). To estimate annual costs in 2018 we aggregate all variable costs in production and add to the reported labor costs in 2018 in the calculation. Further assumptions used to estimate the level of profits are documented in the notes field at the bottom of Table 7. For example, if the value chain is a short-cycle enterprise that has the potential to generate returns at multiple times in the year we multiply the revenues and costs reported per production cycle by the number of production cycles that the farmer reports in the year 2018. This gives us an estimate of the total profitability in 2018 of that particular value-chain, where we consider if returns for the value chain are generated in about 12 weeks, for example, then farmers could potentially generate up to 4 cycles of benefits annually. In the data, cassava, wheat, maize are predominantly cultivated in rainfed systems with only one production season a year and so the majority of farmers report only one benefits cycle; whereas some rice farmers in irrigated areas are able to cultivate 2 crops annually. The tomato value chain has the possibility of multiple benefits cycles and farmers report an average of 3.7 benefit cycles annually. In the poultry value chain, we present estimates aggregated across all the different types of chickens but we ensure that the production cycles for each type of chicken are separately accounted for. For example, the data suggests that farmers can generate and average of 1.5 cycles of benefits annually for layer chickens (used for eggs) and an average of 3.5 cycles of benefits for broiler chickens (used for meat). Similarly, in aquaculture we aggregate across all the different types of fish products (catfish and tilapia) but take into account that catfish has an average of 2.7 production cycles annually in the estimation for 2018 annualized profits.[23]

Appendix A3: Socio-emotional Skills Measures

The following measures were asked to a random subsample of 50% of the applicants where the randomization was done directly in the electronic tablet stratified by region and gender. The respondents are asked to indicate how much each statement is true for them by using the following Likert scale: "for each statement, please tell me whether you: 1. Strongly disagree, 2. Disagree, 3. Neither disagree nor agree, 4. Agree, or 5. Strongly agree. Your answers refer to how you think you are and not how you would like to be in the future".

Personal Initiative Index - mean of responses to seven items
- Based on Frese, Fay, Hilburger, Leng, & Tag (1997)

- Scale reliability: Cronbach's alpha = 0.70

- I take initiative immediately even when others do not.
- I use opportunities quickly in order to attain my goals.
- Usually I do more than I am asked to do
- I am particularly good at realizing ideas.
- Whenever something goes wrong, I search for a solution immediately.
- Whenever there is a chance to get actively involved, I take it.
- I actively attack problems.

Generalized Self Efficacy Index (modified) – mean of responses to eight items
- Based on Schwarzer, R., & Jerusalem, M. (1995).

- Scale reliability: Cronbach's alpha = 0.84

- I can always solve difficult problems if I try hard enough.
- It is easy for me to stick to my aims and accomplish my goals.
- I am confident that I could deal appropriately with unexpected events
- Thanks to my skillful and creative thinking, I know how to handle unforeseen situations.
- I can solve most problems if I put in the necessary effort.
- When I am confronted with a problem, I can usually find several solutions.
- If I am in trouble, I can usually think of a solution.
- I can usually handle whatever comes my way.

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[23] In some cases revenues and costs were reported for 2018 aggregated rather than per production cycle. In those cases we do not multiply by number of production cycles when calculating that particular value chain's sales revenue or cost estimate.

Perseverance Index – mean of responses to three items

- Based on measure used in Montalvao et al., 2017

- Scale reliability: Cronbach's alpha = 0.68

- I can think of many times when I persisted with work when others quit
- I continue to work on hard projects even when other oppose me
- It is important to me to do whatever I'm doing as well as I can even if it isn't popular with people around me

The following measures were constructed from single statements that were asked on a Likert scale:

Conformity
- I think it is best to do things in traditional ways and keep up the customs I have learned.

Interpersonal - networking
- I spend a lot of time developing connections with others.

Creativity
- When faced with difficulties, I look for alternative solutions

Interpersonal - sociable
- I am someone who is outgoing, sociable

Challenge seeking
- I am very interested in learning new things.

Thinking carefully
- I plan tasks carefully