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From subsistence farming to agribusiness and nonfarm entrepreneurship: Does it improve economic conditions and well-being?

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Abstract:	<p>In this paper, we use data from the 2015 Smallholder Survey to examine the impact of farming as a business (agribusiness) and nonfarm entrepreneurship (NFE) on household income and economic well-being in Uganda. We find that, in comparison to subsistence farming, engaging in agribusiness and NFE boosts household income and economic well-being, especially in rural areas with high poverty rates. Our research contributes to the literature by offering new evidence on the efficacy of entrepreneurial initiatives in the specific context of a developing country with a large rural and agricultural economy. In terms of policy, our analysis provides support for the promotion of agribusiness and NFE initiatives to reduce poverty and overcome disparities between urban and rural settings.</p>

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Once again, thank you very much for the excellent review process and we look forward to hearing from you.

Kind regards.

The authors

**From subsistence farming to agribusiness and nonfarm entrepreneurship:
Does it improve economic conditions and well-being?**

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Highlights

- Farming as a business and business ownership improve income circumstances.
- Business ownership has a strong effect on economic well-being in rural areas.
- Farming as a business improves economic well-being in rural areas.
- Business and shop ownership contribute to poverty reduction.

From subsistence farming to agribusiness and nonfarm entrepreneurship: Does it improve economic conditions and well-being?

ABSTRACT

To eradicate poverty, governments across developing countries have adopted programs to promote business ownership, with varying levels of success. The mixed success of such programs underscores the importance of local business and economic conditions. Yet, empirical evidence on how local context shapes outcomes of entrepreneurship-focused poverty initiatives is sparse. In this paper, we use data from the 2015 Smallholder Survey to examine the impact of farming as a business (agribusiness) and nonfarm entrepreneurship (NFE) on household income and economic well-being in Uganda. We find that, in comparison to subsistence farming, engaging in agribusiness and NFE boosts household income and economic well-being, especially in rural areas with high poverty rates. Our research contributes to the literature by offering new evidence on the efficacy of entrepreneurial initiatives in the specific context of a developing country with a large rural and agricultural economy. In terms of policy, our analysis provides support for the promotion of agribusiness and NFE initiatives to reduce poverty and overcome disparities between urban and rural settings.

Keywords: subsistence farming, agribusiness, nonfarm entrepreneurship, well-being, poverty

1. Introduction

Policy makers around the world strive to eradicate extreme poverty, which still affects a large share of the global population, especially those living in sub-Saharan Africa (Bruton, Ketchen & Ireland, 2013; Schoch and Lakner, 2020; Zhou & Liu, 2019). Although the share of the world population living under the extreme poverty line dropped to 9.2% in 2017, from 36.2% in 1990 according to World Bank data, eliminating poverty has proved to be a daunting challenge. For example, a recent study by Lakner, Mahler, Negre & Prydz (2020) suggests that the number of people living on less than \$1.90/day will exceed 600 million in 2030. Despite sustained efforts by governments over the years to introduce initiatives to help national economies escape poverty traps and break the dependency on subsidies or foreign aid, many of the developing countries have been caught in a cycle of seemingly inescapable welfare dependency (Aghion, Caroli, & Garcia-Penalosa, 1999). Such initiatives have been wide-ranging in their scope and approach. They include financing infrastructure projects (Parker, Kirkpatrick, & Figueira-Theodorakopoulou, 2008), investing in training (Majumder & Biswas, 2017), attracting foreign direct investment (Magombeyi & Odhiambo, 2017), and implementing structural or institutional reforms (Guo, Zhou, & Liu, 2019). Increasingly, policy makers have also shifted their emphasis towards entrepreneurship as an avenue for improving an individual's economic situation (Bruton et al., 2013; Prieger, Bampoky, Blanco, & Liu, 2016).

In implementing entrepreneurship policies, authorities in developing countries have developed programs to support business start-ups and business ownership, with varying levels of success (for a review, see Sutter, Bruton, & Chen, 2019). According to Court and Maxwell (2005), the mixed success of entrepreneurial initiatives to tackle poverty and income inequality underscores the importance of considering local conditions. Kimhi (2010), for example, found that entrepreneurship programs reduce household income inequality in Southern Ethiopia, but they are more successful when directed towards those lower in the income distribution. Although Maksimov, Wang & Luo (2017) confirm a positive influence of entrepreneurial ventures on economic efficiency and wages in seven least developed countries in Africa, Asia, and the Middle East, this effect is stronger for SMEs with a government contract, higher exports, and female ownership. Likewise, entrepreneurship initiatives in urban and rural regions of China have been successful in reducing poverty, but much more so in urban, developed regions with superior financial services (Lin, Winkler, Wang, & Chen,

2020). Dhahri & Omri (2018) show that across 20 developing countries, entrepreneurship contributes to the economic and social dimensions of sustainable development, but often at the expense of local social conditions and environmental objectives. Focusing on six sub-Saharan countries, Nagler & Naudé (2017) explore patterns of nonfarm enterprises using World Bank's Living Standards Measurement Study - Integrated Surveys on Agriculture (LSMS - ISA). Their findings suggest that rural households run enterprises mostly in low-starting cost activities, such as sales and trade, but they are more successful when located closer to urban centers. Nevertheless, a lack of profitability, finance, and idiosyncratic shocks result in high failure rates. Overall, Nagler & Naudé (2017) paint a pessimistic picture on the impact of NFE in Africa, stressing how important it is to consider individual, regional, and national contexts. This is consistent with a consensus in the literature about the significance of local economic and institutional contexts as drivers of entrepreneurial success (Simón-Moya, Revuelto-Taboada, & Guerrero, 2014).

Despite a broad acceptance of local context as a main factor influencing the efficacy of antipoverty measures, many policy initiatives rely on research insights adopting a global or a West-centric perspective. As Mamman, Bawole, Agbebi, & Alhassan (2019) maintain, SME policies in sub-Saharan Africa, based on theoretical assumptions of Western developed economies, fail to account for idiosyncrasies of local business environments. Yet, empirical evidence on how local context shapes outcomes of entrepreneurship-focused poverty initiatives is sparse. As a result, we still know little about what business start-up programs are most effective in reducing poverty in developing countries with large rural economies and agriculture.

In this article, we fill this gap by examining whether agribusiness (farming as a business) and nonfarm entrepreneurship (NFE) can improve economic well-being in Uganda. Uganda is a developing country that has purposely embraced entrepreneurship. Having reduced poverty by half, Uganda is hailed as an African success story (Malberg, 2016). Between 1992 and 2010, it achieved the UN Millennium Development Goal and tripled its GDP per capita (International Monetary Fund, 2017). On average, over the period 2011 to 2018, the Ugandan economy grew at a faster rate (5.2%) than the sub-Saharan region (3.4%), while the growth rate in 2019 was 6.8% (World Development Indicators-WDI). Data from WDI and the Ugandan National Household Survey also shows that between 1992 and 2016, absolute poverty declined from 56.4% to 21.4%. Although this indicates growth overall, there are wide income inequalities, with the Gini Co-efficient increasing from 0.395 in 1999/2000 to 0.47 in 2014/15 (Oxfam,

2016). In the same period, the number of entrepreneurs¹ increased to 28.1% of the labor force, making Uganda the most entrepreneurial country in the world (Global Entrepreneurship Monitor, 2014). A strong positive link between entrepreneurship and the success of Uganda in reducing poverty reaffirms the validity of past theoretical arguments. Prior research has established the pivotal role of entrepreneurship as a driver of economic growth, job creation, poverty reduction, and societal well-being (Adusei, 2016; Ahlstrom, 2010; Alvarez, Barney, & Newman, 2015; Bruton et al., 2013; Clark, 2017; Naudé, 2010).

Of course, entrepreneurship encompasses diverse activities dependent on context. A major structural change in Uganda is the transition from subsistence farming to agribusiness in rural areas accompanied by an increase in NFE in urban areas (Nagler & Naudé, 2017). This development was also spurred by business start-ups related to agriculture, stimulating more interaction between NFE and farming businesses in rural areas. Scholars argue that such start-ups are main emissaries for innovation, technological change, and internationalization (Haggblade, Hazell, & Reardon, 2010; Naudé, 2011; Nagler & Naudé, 2017). In light of such a shift towards agribusiness and nonfarm business ownership, we ask whether agribusiness farmers and nonfarm entrepreneurs enjoy higher household income or economic well-being than subsistence farmers. We also seek to answer whether engaging in agribusiness or NFE is a viable route out of poverty and welfare dependency. Examining these questions empirically is worthwhile because of the contextual nature of the benefits of an economic shift toward NFE for aspiring entrepreneurs.

To provide answers to these questions, our analysis contributes new empirical evidence on how agribusiness and NFE affect household income and economic well-being, using data from the 2015 Small Holder Survey in Uganda. The survey distinguishes between different types of entrepreneurship: a) subsistence farming; b) agribusiness; c) NFE; and d) small-scale ventures or shop ownership. This taxonomy allows us to distinguish subsistence farming entrepreneurs from potential transformational entrepreneurs who strive to achieve more than just meeting basic needs (Schoar, 2010). The Small Holder Survey also identifies individuals in professional occupations, white-collar jobs, and laborers.

Following Schoar (2010), we distinguish between entrepreneurs involved in subsistence farming (i.e., subsistence entrepreneurs) and those involved in agribusiness or NFE such as

¹ The GEM Entrepreneurship Monitor Global Report 2014 defines entrepreneurship in chapter one, p.17 as: “Any attempt at new business or new venture creation, such as self-employment, a new business organization, or the expansion of an existing business, by an individual, a team of individuals, or an established business.” (Reynolds, Hay, & Camp, 1999, p. 3).

business ownership or shop ownership (i.e., transformational entrepreneurs). Subsistence farming offers an alternative economic activity for those who fail to secure paid employment and have no means for starting their own businesses. However, subsistence farming is often a stepping-stone towards agribusiness or nonfarm business ownership. It is also a potential pathway from ‘informal’ entrepreneurship into more formal operations through learning, experience, networking, and the possible accumulation of start-up capital associated with subsistence activities (Williams, Martinez- Perez & Kedir, 2017). Our research informs the urgent and timely debate on how entrepreneurship can provide an avenue for developing economies to break through poverty traps (Morris, Santos, & Neumeyer, 2018). Our findings further support calls for policies to aid the transition from subsistence farming to farming as a business, to strengthen innovation and to provide diverse opportunities, such as NFE, that further improve economic well-being.

The paper proceeds as follows. Section 2 reviews prior work and presents the expected utility theory, which forms the main foundation of our hypotheses. Details of data and empirical models, namely ordered logit, generalized ordered logit, and binary probit are presented in section 3. A presentation of the empirical results follows in section 4. Section 5 discusses the findings as well as the policy implications of the findings, and then offers suggestions for future work. Finally, section 6 concludes.

2. Background and hypotheses

2.1. Income and economic well-being

According to the expected utility theory of entrepreneurship, individuals decide to become entrepreneurs when expected pecuniary or nonpecuniary rewards from entrepreneurship exceed those from paid employment (Douglas & Shepherd, 2002; Saridakis, Marlow & Storey, 2014). Drawing on the expected utility model of entrepreneurship decisions, previous theoretical explanations have broadly categorized entrepreneurial motivations into push and pull factors (for a review see, Murnieks, Klotz, & Shepherd, 2020). The push motivation suggests that individuals enter entrepreneurship because of negative external forces, such as low-pay jobs or discrimination in the labor market (Saridakis, Mendoza, Muñoz Torres & Glover, 2016). Thus, they engage in self-employment because of ‘necessity’. Pull motivations are associated with a wish to make lifestyle changes, achieve more self-autonomy, or gain higher income (Martiarena, 2019). In practice, however, decisions to pursue entrepreneurship

as a career are complex, often driven by both push and pull factors, depending on local context. Using survey data for Uganda, Bewayo (1995) shows that most participants (about 60%) mentioned increasing income as their main motivation to seek entrepreneurship opportunities. Other studies find that a lack of satisfactory paid employment has pushed many individuals in Uganda to seek entrepreneurial ventures in agribusiness, a sector experiencing a rapid growth in technological innovation (Tuheirwe-Mukasa, Haveraaen, Sansa-Otim, Kanagwa, & Rwamahe Mujuni, 2019). This echoes similar empirical findings in other developing countries suggesting that necessity entrepreneurs are more prevalent than opportunity entrepreneurs (Brünjes & Diez, 2013; Eijdenberg & Masurel, 2013).

The prevalence of necessity entrepreneurship in countries at an early stage of their development implies that entrepreneurial ventures are likely to be characterized by low productivity as well as low levels of innovation. Nevertheless, agribusiness offers opportunities to adopt ‘hard’ technologies, which aim to intensify food production and efficiency. Equally, there is scope to exploit ‘soft’ technologies, such as information technology (ICT), to increase sales through either digital marketing or through faster communication with customers. However, for entrepreneurial ventures in agribusiness to succeed, good governance and financial stability as well as favorable economic conditions need to be in place (Morris, Henley, & Dowell, 2017; Omri, 2020). These need underpinning with a strong institutional support framework (Adobor, 2020). Effective positioning in commodity markets is equally central for the success of agribusiness ventures (Brenes, Ciravegna, & Acuña, 2020). Unfortunately, in rural regions individuals are often pushed into subsistence farming, producing food for home consumption, with ineffective positioning and limited access to urban or international markets that will allow them to generate extra income. Adopting new technologies and gaining wider market access are further hampered by corruption (Adomako, Amankwah-Amoah, Tarba, & Khan, 2020). Responding to these challenges, government policies to support agribusiness in Uganda are centered around improving market accessibility as well as improving energy, transport, and technology infrastructure (FAO, 2015). The above literature suggests that successful agribusiness farmers or nonfarm business owners can enjoy higher household incomes that will allow them to finance consumption beyond satisfying basic needs and they can experience an improvement in their economic well-being.

H1: *Being an agribusiness farmer or a nonfarm business owner improves a household member’s income compared to being a subsistence farmer.*

H2: Being an agribusiness farmer or a nonfarm business owner improves a household member's economic well-being compared to being a subsistence farmer.

2.2. Poverty

As countries progress through their different stages of economic and technological development, they provide added human and financial resources for innovation-driven (nonfarm) business ownership to thrive. Innovative nonfarm businesses fuel economic growth, which in turn reduces poverty levels. Higher household incomes support an increased demand for non-food items related to health or lifestyle, which further stimulates NFE activity, strengthens links between urban and rural regions, and encourages pursuing of international trade opportunities (see Haggblade et al., 2010). Besides, higher household incomes influence NFE directly by easing start-up capital constraints. Nandamuri & Gowthami (2013) find, for example, that high income households in India are more likely to pursue NFE because they are not constrained by lack of financing. Adusei (2016) provides added support for a positive association between entrepreneurial ventures and economic growth using a sample of 12 African countries. In a similar fashion, Si, Yu, Wu, Chen, Chen, & Su (2014) find a positive influence of entrepreneurial ventures improving the economic status of poor households in rural China. They specifically point out that for ventures to succeed entrepreneurs must work closely with residents of the Eastern City of Yiwu who have a good knowledge of local markets. In Africa, rates of nonfarm firm births are about 22 percent. However, how well agriculture as a sector performs affects entrepreneurial business in urban and rural areas (Haggblade et al., 2010).² Overall, half of these firms do not survive after three years, with rural nonfarm firms facing lower growth and survival rate prospects compared with their urban counterparts (Haggblade et al., 2010). In analyses of entrepreneurial ventures in Africa, rural nonfarm entrepreneurship has been depicted as a risk diversifying factor, though transitory and subject to country-specific policies (Nagler & Naudé, 2017). Hence, we hypothesize:

H3: Being an agribusiness farmer or a nonfarm business owner reduces the likelihood of a household member living below the poverty line (\$2.5/day) compared to being a subsistence farmer.

² Haggblade et al. (2010) report that in Africa, 39 percent of the total rural NFE workforce comprises women, who significantly contribute to overall household income.

Figure 1 summarizes our conceptual model, which shows the relationship between business activity and outcomes along with the expected signs, as suggested in the discussion above. For simplicity, Figure 1 displays two broad occupational groupings that have emerged from farming and non-farming activities. Farming activity is divided into subsistence and agribusiness activities, whereas the non-farm business is divided into large (business ownership) and small-scale ventures (shop ownership). The latter three categories include the business ownership category. In line with our hypotheses, Figure 1 shows that business ownership positively affects income and economic well-being, and it is negatively associated with poverty.

[INSERT FIGURE 1 HERE]

3. Methodology

3.1. Data and sampling

Our analysis is based on data from the 2015 Smallholder Survey (SHS), a nationally representative survey of smallholder households in Uganda. The data from this survey is representative of the population of Uganda, which allows the findings of this paper to be generalized for all smallholder households in Uganda. The entire sample size was firstly allocated to the four regions of Uganda (i.e., Central, Western, Eastern, and Northern), proportional to the number of households in each region. The sample allocated to each region was then distributed between the urban and rural areas. The sampling method used for this survey was stratified multistage sampling. The head of the household or an adult who had knowledge of the household characteristics was given a household questionnaire. The data collection was carried out by 26 interviewing teams, each consisting of one supervisor and five interviewers, during the period August 16th to September 7th, 2015. Each interviewer collected the survey data electronically on mobile phones. To ensure the validity of the survey data, an independent quality control team was hired to observe and oversee the data collection. All household members above the age of 15 engaged in agricultural activities or added to the household income were also administered a multiple respondent questionnaire (for a detailed description of the survey, see Anderson, 2016). For the analysis here, we merged data from the main household survey ($n = 2,870$; response rate = 92.6%) and the survey of individual

household members ($n = 5,517$; response rate = 93.6%). About 59.56% of respondents were men. The final matched sample used in estimations included 5,055 individuals in 2,859 households.

3.2. Measures

3.2.1. Dependent variables

Income

Household members were asked about household average monthly income from all sources and the minimum monthly amount needed to survive (i.e., covering basic needs such as food, transport, cooking fuel, and clothes). Taking the difference between reported incomes and expenses, we built a three-point index (S_i) for monthly income circumstances of households.

A test of equality of proportions for index S_i between urban and rural areas points to statistically insignificant differences for the 2 and 1 categories. For the 0 category, the difference is statistically significant (F-value=5.17 and p-value=0.023; F-value=2.62 and p-value=0.105; F-value=2.6 and p-value= 0.107, respectively).

		All	Urban	Rural
$S_i =$	2 Surplus	14.43%	12.77%	14.79%
	1 Breaking even	4.43%	3.5%	4.64%
	0 Don' t make enough	81.14%	83.73%	80.57%

Economic well-being

Further, household members were asked to reflect on financial circumstances of their family, which we used to construct a four-point household well-being index (W_i). Unlike household income, we find statistically significant differences in economic well-being between households in rural and urban areas. A test of equality of proportions for index W_i between urban and rural areas points to significant differences within the 0, 2 and 3 categories (F-value=42.16***; F-value=30.78***; F-value=15.54***, respectively; *** $p < 0.01$), but an insignificant difference within the 1 category (F-value=0.53 and p-value=0.468).

		All	Urban	Rural	
$W_i =$	3	Afford to buy certain expensive goods	2.35%	4.76%	1.84%
	2	Can also save a bit, but not enough to buy expensive clothes	21.62%	29.14%	19.94%
	1	Have enough money for food and clothes only	41.11%	40.02%	41.35%
	0	Don't have enough money for food	34.93%	26.408%	36.89%

Poverty

Finally, a dichotomous variable is used to mark the poverty level of households using the Progress out of Poverty Index (PPI) threshold. Households with PPI scores at or below \$2.5 a day are considered to be poor. This is based on World Bank's Europe and Central Asia threshold. Poverty is found to be strongly concentrated in rural regions (see also Liu, Liu, & Zhou, 2017) with a rate of nearly twice as high compared with that in urban regions.

		All	Urban	Rural	
$P_i =$	0	Above poverty line \$2.5/day	34.12%	61.24%	28.14%
	1	Below poverty line \$2.5/day	65.88%	38.76%	71.86%

The test of equality of proportions, P_i , between urban and rural areas suggests significant differences within the 0 and 1 categories (for both F-value=443.63***).

3.2.2. Explanatory variables

Occupational status

Respondents provided information about their main occupation, defined as a job in which they spend most of their time. Most respondents were farmers (74.83% of total sample). The remaining were professionals (3.55%), shop owners (1.73%), business owners (5.57%) and laborers (5.37%). Approximately 8.95% held other occupations. Of those who were farmers, 30.56% perceived their activity in agriculture as a subsistence activity while 69.44% perceived it as a business activity. In this study, we are interested in examining whether economic circumstances and well-being of business owners or business farmers are superior to those of subsistence farmers.

Other controls

The set of controls includes individuals' age, gender, and educational level. Specifically, average age was 35.69 years old (std. dev. =16.02). Almost a quarter (24.8%) of respondents were single or had never been married. In addition, 73.79% had ever attended school. Farmers and laborers had the lowest educational attainment whereas business owners, shop owners and professionals had the highest qualifications. When separating subsistence farmers from agribusiness farmers, we found the latter group to have a stronger educational background. In our model, we also controlled whether individuals lived in urban or rural areas. About 18.31% of respondents in our sample lived in urban areas. Finally, to control for potential regional differences, we included four administrative dummy variables for Central (22.25%), Eastern (29.01%), Northern (20.38%), and Western (28.36%) regions.³

3.3. Empirical models

3.3.1. Income and economic well-being

To examine hypotheses *H1* and *H2*, we first perform an ordered logit analysis. The ordered logit for S_i and W_i is written as follows:

$$y_i^* = \alpha + b'X_i + u_i \quad (1)$$

where y_i^* represents a latent variable (in our case, S_i^* or W_i^*) and y_i is individuals' household income and economic well-being (i.e., S_i and W_i , respectively). X_i is a vector of exogenous characteristics influencing S_i^* or W_i^* . The coefficient b is a vector of parameters to be estimated along with ordered logit cut-off points.⁴ u_i is the error term.

For completeness, we test a parallel regression (or proportional odds) assumption using both a likelihood ratio test and a Brant test (Brant, 1990). These tests indicate that the parallel regression assumption is violated in the economic well-being model.⁵ In this case, a generalized

³ Central excludes Kampala city since it is entirely urban.

⁴ The intercept (α) and cut points cannot be identified simultaneously thus, it can be assumed that $\alpha = 0$. S_i^* and W_i^* have three and four ordered categories, respectively. Hence, two and three cut points will be estimated by maximum likelihood (ML), respectively.

⁵ For the income circumstances model, we found the likelihood ratio χ^2 value to be 16.77 (p -value=0.269), which is similar to that obtained from the Brant test (18.11 with p -value=0.202). For the well-being model, the likelihood

ordered logit model is used, which allows the vector of regression coefficients to vary across j .⁶ This can be written as:

$$P(y_i > j) = g(X\beta_j) = \frac{\exp(\alpha_j + X_i\beta_j)}{1 + \{\exp(\alpha_j + X_i\beta_j)\}}, \quad j = 1, \dots, m - 1 \quad (2)$$

where m is the number of categories of the ordinal dependent variable. For parsimony, we use a partial proportional odds model, which is a modified version of the above model allowing some of the β coefficients to be the same for all values of j , while others can differ. We therefore present these results along with ones derived from ordered logit estimations to check for robustness of our result.

3.3.2. Poverty

To test $H3$ we use a probit model. We define a latent variable P_i^* that represents the propensity of an individual i to be at or below the poverty line (\$2.5/day). We do not observe P_i^* , but we are able to monitor whether an individual i is below the poverty line through the following equation:

$$P_i = \begin{cases} 0 & \text{if } P_i^* \leq 0 \\ 1 & \text{if } P_i^* > 0 \end{cases} \quad (3)$$

$$P_i^* = X_i b_i + \tau_i, \quad \tau_i \sim N(0, \sigma^2) \quad (4)$$

where b 's are the parameters to be estimated using ML techniques.

4. Empirical results

4.1. Income

We investigate the impact of agribusiness and NFE on household incomes. Table 1 displays the regression results. Panel (A) shows the estimated coefficients of ordered logit. Panels (B) and (C) show ordered logit and generalized ordered logit marginal effects respectively. Estimated coefficients in Panel (A) confirm that involvement in farming as a business,

ratio χ^2 value was found to be 131.61 (statistically significant at the 1% level), which is comparable to that obtained from the Brant test (128.20, which is statistically significant at the 1% level).

⁶ A generalized ordered probit model provides similar results (results are available upon request).

professional occupations, and business ownership increase the likelihood of being in a higher income category. A test of whether the four coefficients are equal cannot reject the equality hypothesis ($\chi^2(2) = 4.28$, prob = 0.233). Being single/never married reduces the likelihood of being in the ‘surplus’ category. There is also some evidence of a regional impact, with individuals living in Central, Northern, and Eastern regions being more likely to be in the higher income category than those living in the Western region. Education and living in an urban area have no statistically significant effects.

[INSERT TABLE 1 HERE]

The marginal effects in Panels (B) and (C) imply that engaging in entrepreneurship as a business owner decreases the likelihood of ‘Don’t make enough’ compared with the base category (subsistence farmer) by 6.6 percentage points. Professional occupations, shop owners, and agribusiness farmers decrease the likelihood of ‘Don’t make enough’ by 8.1, 5.5 and 5.8 percentage points respectively. Furthermore, as expected, those in professional occupations (doctor, teacher, nurse) enjoy higher incomes. However, marginal effects also show that those in agribusiness and NFE are more likely to be in a higher income category. In comparison, laborers are not better off when compared with subsistence farmers. These results support Hypothesis 1.

4.2. Economic well-being

Table 2 displays ordered logit results of how occupational status affects economic well-being. The coefficients in column A broadly support hypothesis 2. NFE, including business ownership as well as shop ownership, improves economic well-being in Uganda compared to subsistence farming. However, coefficients are relatively smaller in size than for professionals ($\chi^2(2) = 6.43$ prob<0.05), but larger than those for farming as a business ($\chi^2(2) = 26.97$, prob < 0.001). Further, there is a strong positive association between education and economic well-being. Men enjoy higher levels of well-being than women. Estimated coefficients also show that well-being declines with age. Individuals living in urban centers are more likely to experience higher economic well-being than those living in rural areas. Strong regional effects are also present, with only those located in the Central region reporting increased economic well-being compared to those in Western region.

[INSERT TABLE 2 HERE]

Columns B and C of Table 2 report separate estimates for urban and rural areas. The results are striking. For urban areas, business ownership has a strong effect on economic well-being and almost matches that of being a professional. A test of equality of professionals and business ownership coefficients does not reject the equality hypothesis ($\chi^2(1) = 0.01$, prob = 0.927). In contrast, for rural areas, even a small-scale NFE, such as shop ownership, has a statistically significant effect on economic well-being. Also, in rural areas, farming as a business improves economic well-being compared to subsistence farming.

Table 3 presents marginal effects of different occupational groups on economic well-being. This analysis suggests that when compared to subsistence farmers, business owners are 15.7 percentage points more likely to ‘save a bit...’. Moreover, business owners in urban areas are 5.6 percentage points more likely to report that they ‘Can afford to buy certain expensive goods’ than subsistence farmers. However, this effect size is smaller for business ownership in rural locations (1.6 percentage points). In contrast, in rural areas smaller scale firms, such as agribusiness or shop ownership, substantially improve individuals’ economic well-being. The findings suggest that professionals and business owners in urban centers are best placed to create wealth. Yet in rural locations, shop owners, and to a lesser extent, agribusiness farmers, are also wealth creators. Overall, these findings confirm that entrepreneurs enjoy greater returns in economic well-being than laborers in paid employment.

[INSERT TABLE 3 HERE]

Table 4 summarizes generalized ordered logit marginal effects. Although our analysis shows that these effects are in line with those in Table 3, they point to a stronger impact of shop ownership and business ownership. This is especially true for higher categories of the well-being indicator. Specifically, for the overall sample, the marginal effect of business ownership in the higher category is twice that based on the ordered logit model. Shop ownership marginal effect for this category is four times bigger compared to that reported in Table 3. Separate estimates by urban or rural areas reveal stark differences. Marginal effects are stronger in rural areas where NFE exerts a strong influence on economic well-being. Overall, these findings support hypothesis 2.

[INSERT TABLE 4 HERE]

4.3. Poverty

Turning to hypothesis 3, we examine the impact of entrepreneurship on citizens who live below poverty lines by estimating a probit regression model. Table 5 summarizes the results. Separate estimates by urban vs. rural areas are also presented, pointing to some differences between these urban areas and rural areas.⁷ Looking at the marginal effect of being a business owner, we find that it is significantly associated with a lower probability of being below the poverty line, thus providing strong support for hypothesis 3. In particular, business owners are 38.1 percentage points less likely to be below the poverty line than subsistence farmers. In fact, marginal effects of the six occupational choices are all statistically significant, although their strength varies. For instance, there are two distinct occupational groups. A first group comprises professionals, shop owners and business owners, with marginal effects of 37.6, 38.3, and 38.1 percentage points respectively. These effects are nearly equal in size ($\chi^2(2) = 0.01$, $\text{prob} = 0.993$). Among these occupations, however, shop ownership contributes most to poverty reduction in rural areas. A second group comprises agribusiness farmers, laborers, and ‘others’ with marginal effects of 5, 9.2, and 10 percentage points respectively. However, laborers in urban centers have a 22% lower chance of being below the poverty line. Perhaps this is not surprising as workers in urban areas earn higher wages than workers in rural areas (Gould, 2007). Farming as a business in urban areas also contributes to a poverty rate drop by 14 percentage points. This finding could be partially attributed to higher productivity associated with capital investment in urban centers.

[INSERT TABLE 5 HERE]

Unsurprisingly, education exerts a strong, statistically significant influence on poverty reduction. More educated individuals are 16.8% less likely to be in poverty compared to those with less education. However, education effects are larger in magnitude for those living in urban areas than those living in rural areas. This suggests that individuals with higher educational qualifications are more likely to thrive where innovative enterprises operate. Additionally, living in urban centers allows individuals to reap higher incomes associated with

⁷ A model where all variables were interacted with the area dummy was estimated suggesting statistical differences in the estimates of all occupation variables between urban and rural areas, apart from business ownership and shop ownership.

educational investments compared with those living in rural locations with limited opportunities. Together, these results offer strong support for Hypothesis 3.

4.4 Robustness check using propensity score matching

Individuals have inherently different characteristics that affect their economic conditions and well-being as well as their choice in embarking in agribusiness or NFE. To overcome potential endogeneity problems arising from such heterogeneity, we estimate the model using propensity score matching techniques allowing for multiple nominal treatments. In particular, we use the marginal mean weighting through stratification (MMWS) approach (Hong, 2012). We estimate the propensity score using a multinomial logistic regression, which includes covariates (e.g., age, gender, marital status, education) that are potentially associated with entrepreneurial decisions and economic well-being. Table 6 summarizes the MMWS results. The findings confirm that agribusiness, shop ownership, and business ownership improve economic well-being and reduce poverty. Figure 2 depicts predictive margins for each occupational status based on the overall sample and subsamples by urban or rural areas. Figure 2 suggests that individuals involved in NFE are less likely to be in poverty compared to laborers, subsistence farmers, and those in agribusiness.

[INSERT TABLE 6 HERE]

[INSERT FIGURE 2 HERE]

5. Discussion

Past research examining whether entrepreneurship offers a route out of poverty in developing countries has tended to point to a positive impact of entrepreneurial ventures in raising the incomes of those less well-off. However, evidence on the importance of such an effect has been mixed, which has led many to question the efficacy of broad-based, one-size-fits-all entrepreneurial policy initiatives (Nagler & Naudé, 2017). There are two main lacunae in the extant literature that justify such scepticism. First, most of the existing research is based on theoretical assumptions derived from studies in Western economies, such as the presence of a well-established financial system to support business, which do not necessarily exist in less developed countries. Second, previous studies do not always account for local economic

conditions that impede business start-ups and growth. These gaps have strengthened calls for considering local context more explicitly when assessing entrepreneurial initiatives to tackle poverty and income inequality (Court & Maxwell, 2005; Simón-Moya et al., 2014). Responding to these calls, we examined whether agribusiness and nonfarm entrepreneurship improved incomes and economic well-being in Uganda; a country with a large rural sector in transition from subsistence farming to agribusiness and NFE (Nagler & Naudé, 2017).

After controlling for demographic characteristics and variation in incomes between the Western region and the rest of the country, it emerges that individuals who engage in agribusiness enjoy higher incomes than laborers or subsistence farmers. This echoes previous findings for other African countries that confirm agribusiness as a route out of poverty (Adusei, 2016; Munonye & Esiobu, 2017). The findings are also in line with those for other developing or emerging countries. For example, our findings support the study by Naminse, Zhuang & Zhu (2019) documenting a positive association between entrepreneurship and rural poverty reduction in China, thus calling for policies to promote farmer entrepreneurship in rural areas. However, NFE seems to have a wider and stronger impact on individuals' incomes and economic well-being than agribusiness does. Nonfarm entrepreneurs are also much less likely to be living under the poverty line than agribusiness entrepreneurs or subsistence farmers. Notably, the incomes, economic well-being, and poverty rates among nonfarm entrepreneurs are comparable to those in professional occupations. Our analysis further underscores the stronger impact of agribusiness and NFE on poverty reduction in urban areas, in comparison with rural areas.

Engagement in agribusiness and NFE can support long-term poverty alleviation strategies aiming to improve household income and boost economic well-being, through entrepreneurial training, support, finance and technology (see for example, Mensah & Benedict, 2010; Merotto, 2019). Policies that encourage regional trade foster market integration between rural and urban regions, encourage the development of new products and production methods, and improve supply channels. As such, they facilitate entrepreneurial activity and growth in other, high value-added sectors (Merotto, 2019). Given the significant fraction of Uganda's population in subsistence farming or entrepreneurship due to lack of alternative opportunities, our research can be used alongside others (Merotto, 2019; Naminse et al., 2019; Mensah & Benedict, 2010) to develop better-calculated policies and opportunity-based choices to reap the full economic potential of Uganda's young and fast-growing labor force (see also Byamugisha, Shamchiyeva & Kizu, 2014). Although more entrepreneurial opportunities are likely to emerge in urban cities, policies should also consider age and gender differences as recent research shows that

urban migration may affect the allocation of time to entrepreneurial activities differently for these groups (see Litsardopoulos, Saridakis & Hand, 2020).

This article contributes to the entrepreneurship and small business literature in several distinct ways. From a theoretical standpoint, the findings add weight to previous theoretical arguments that entrepreneurs experience improved economic conditions and well-being, depending on regional context and type of entrepreneurial venture (Fritsch & Storey, 2014). Specifically, it confirms the differential impact of subsistence farming, agribusiness, and NFE on incomes and economic well-being in the context of a developing economy with a large rural sector. Therefore, it highlights the role of subsistence farming as a stepping-stone towards agribusiness and nonfarm business ownership. In this sense, subsistence farming can be a starting point of a potentially viable pathway from ‘informal’ entrepreneurship towards more formal business operations through the accumulation of start-up capital, knowledge, experience, and networking activities. This adds to the argument that unregistered, informal entrepreneurship can lead to successful formal enterprises in Africa. Informal enterprises are not necessarily confined to being a sub-contractor or subservient to formal enterprises, if they are able to benefit from supportive local contexts (Williams & Kedir, 2017). To the best of our knowledge, this is one of the first studies to compare the differential economic well-being impacts of various types of entrepreneurial ventures, vis-à-vis alternative wage-employment occupations, in a rural and an urban setting.

From a methodological standpoint, the more granular analysis in this article was facilitated by using the Small Holder Survey, which allowed us to consider entrepreneurship benefits in perspective. The survey identifies subsistence farming, agribusiness, and NFE as distinct types of entrepreneurial ventures and provides information on three wage employment occupations: professional, white-collar jobs, and laborers. Previous studies have mostly relied on smaller, more specialized data sets, exploring the social and economic impact of entrepreneurship in developing countries in isolation (Sutter et al., 2019). Another methodological contribution of our study is the use of propensity score matching methods to control for potential endogeneity. Unobserved heterogeneity is often correlated to individuals’ entrepreneurship decisions and their economic circumstances, which cast doubt on whether agribusiness and NFE causally improve economic well-being and reduce poverty. In our case, propensity score matching results do not provide any evidence of endogeneity, thus providing further credence to the causal, positive influence of entrepreneurship.

The article also contributes to policy and practice by informing our understanding of which entrepreneurial ventures are most effective in improving economic well-being and reducing

poverty in rural economies. As the results imply, the efficacy of entrepreneurial ventures to improve economic well-being is higher for NFE and agribusiness than it is for subsistence farming. This suggests that measures to ease the transition from subsistence farming to agribusiness and NFE have a poverty reduction potential. As such, the results enhance the significance of these transition policies. However, as previous findings in the literature suggest, poor infrastructure and weak institutions are main reasons for the prevalence of necessity or survivalist entrepreneurs (i.e., subsistence farmers) in African countries (Adobor, 2020; Bewayo, 1995; Naudé & Havenga, 2005). Consequently, interventions to support infrastructure projects and to strengthen institutions can create a business-friendly environment, which is likely to speed up the transition away from subsistence farming. Although Uganda is ranked as one of the most entrepreneurial nations worldwide, it does not score well in ‘ease-of-doing-business’ (ranked 116 out of 190), which hinders innovation. An improved ‘ease-of-doing-business’ environment would provide the necessary conditions for innovative ideas to be transformed into value-creating activities by enterprises further promoting innovation and sustainable growth (Kauffman, 2007). Therefore, our analysis supports Sander (2003) in advocating a streamlining of business regulations in Uganda to encourage more start-ups. Promoting opportunity-based entrepreneurship requires a more business-friendly institutional environment. As Gatewood & Boko (2009) state, in “...many developing countries, budding entrepreneurs are discouraged by the mound of regulations and the costs in time and money necessary to start and register a business (p. 127).”. Umoren, Akpanuko, & Anietie (2015) present a similar argument. Transforming necessity into opportunity entrepreneurship calls for suitable public policy interventions to bring about an enabling business environment (Fal, 2013). Equally, policy interventions can help transition from ‘informal’ entrepreneurship into more formal operations, which have a greater potential to promote sustainable growth rates (Williams et al., 2017).

Although this article makes some headway in providing new evidence on the impact of agribusiness and NFE on income, well-being, and poverty in Uganda, there is scope for future research. We would encourage studies that examine potential gender differences in business ownership creation and how this relates to economic well-being (Rijkers & Costa, 2012; Nagler & Naudé, 2017). Prior evidence on gender norms discouraging females’ autonomous life-styles (Rietveld, van der Burg, & Groot 2020) warrants future explorations into the role of gender in agribusiness. Although Uganda’s constitution provides equal rights to both genders, it is customary that laws favour property rights for land to be inherited by or given to men. This creates a barrier for females to escape poverty through agribusiness and a push for females to

engage in NFE (Doss, Meinzen-Dick & Bomuhangi, 2014; Rietveld, Ajambo & Kikulwe, 2016; Rietveld et al., 2020). However, a study by Naminse et al., (2019) provides evidence that the feminization of the agribusiness sector in China is improving in helping to tackle youth unemployment. There is also scope for more research focused on the divergent effects of entrepreneurship between urban and rural locations. Another avenue of future research deserving further investigation is the role of age, education, farming experience, family farming history and wealth in influencing how agribusiness or NFE affects household income and economic well-being. Balancing government support and regulations is also worth researching, as it stands to contribute to our understanding of the tensions between streamlining administrative burdens and strengthening laws against bribery (Maweje & Sebudde, 2019). Finally, beyond examining macro-statistical relationships, there is a need to develop a deeper understanding of how entrepreneurs in developing economies survive and grow their enterprises within their specific socio-economic contexts. Such an investigation gains a greater urgency in light of exogenous shocks to supply chains and food systems that have emerged from the COVID-19 pandemic.

6. Conclusion

This article extends our knowledge of how agribusiness and NFE improve incomes and economic well-being in a developing country with a large rural and agricultural sector. It draws on data from the Small Holder Survey to investigate the impact of agribusiness and NFE as drivers of poverty reduction jointly rather than in isolation, as has been the case in previous studies. In particular, it compares the impact of each type of entrepreneurial venture in relation to subsistence farming and different types of wage employment occupations. The article also uses propensity score matching methods to ascertain the causal influence of entrepreneurship as a pathway to poverty alleviation. Hence, this presents a methodological approach that future studies in the field can use more widely to control for possible endogeneity in the relationship between entrepreneurship and local economic conditions. This article has sought to inform the current debate on the role of business ownership on poverty reduction in developing economies (Morris et al., 2018). Overall, our analysis demonstrates that within a specific context, entrepreneurship can make an impact on poverty through increases in income and economic well-being.

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Figure 1. Conceptual framework.

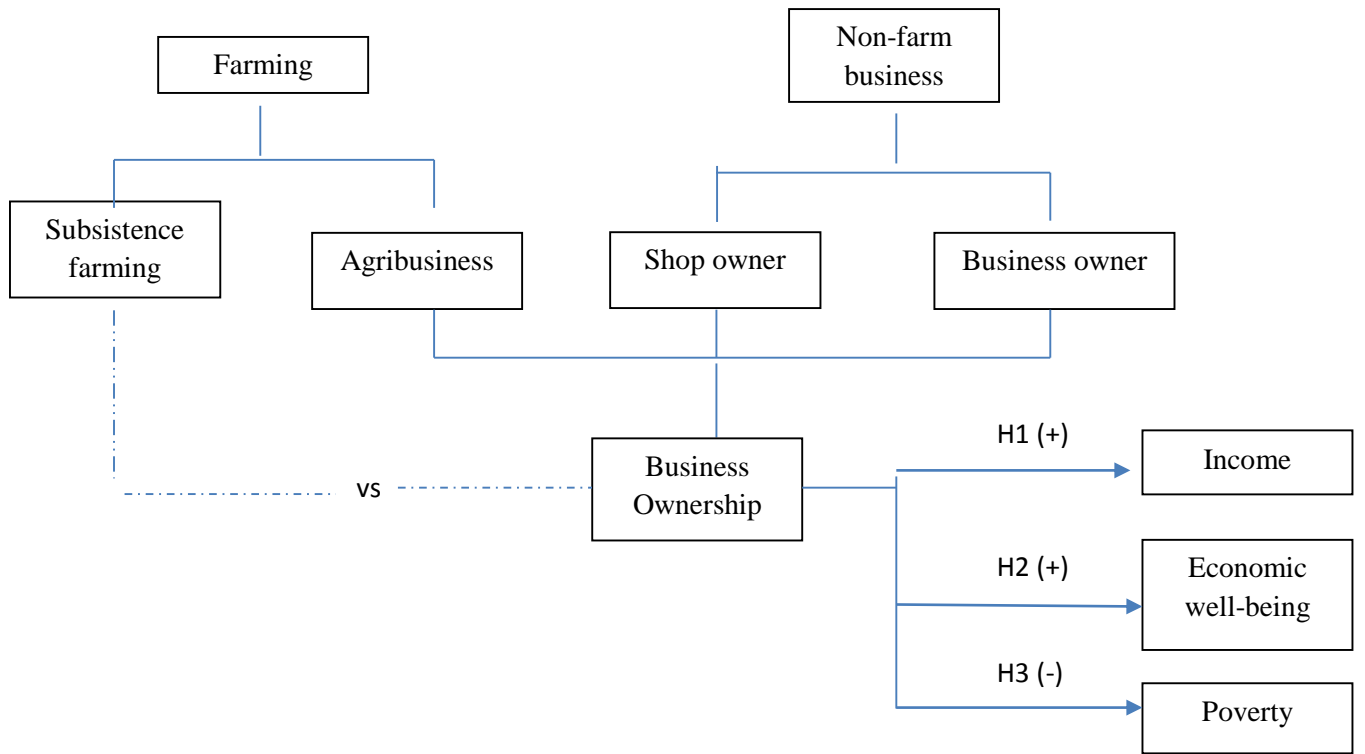
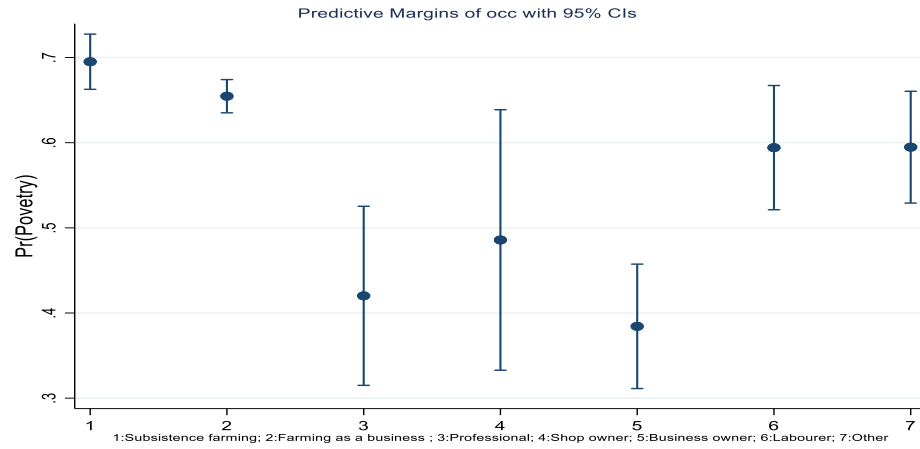
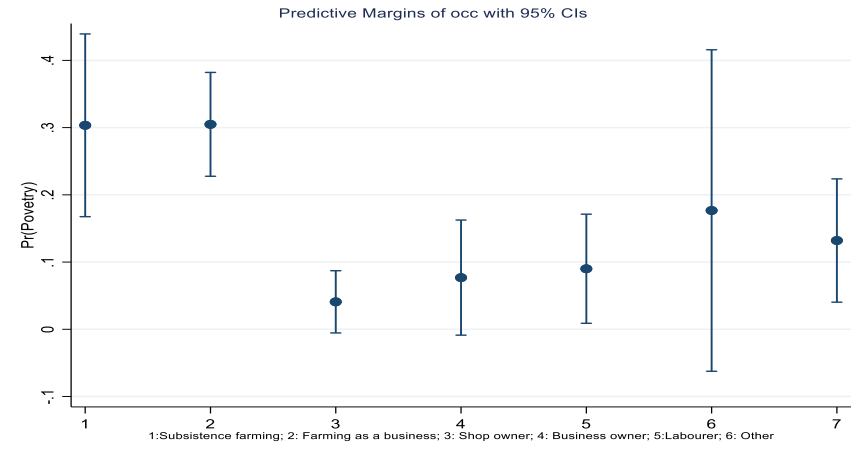


Figure 2. Predictive margins.

A) Full sample



B) Urban areas



C) Rural areas

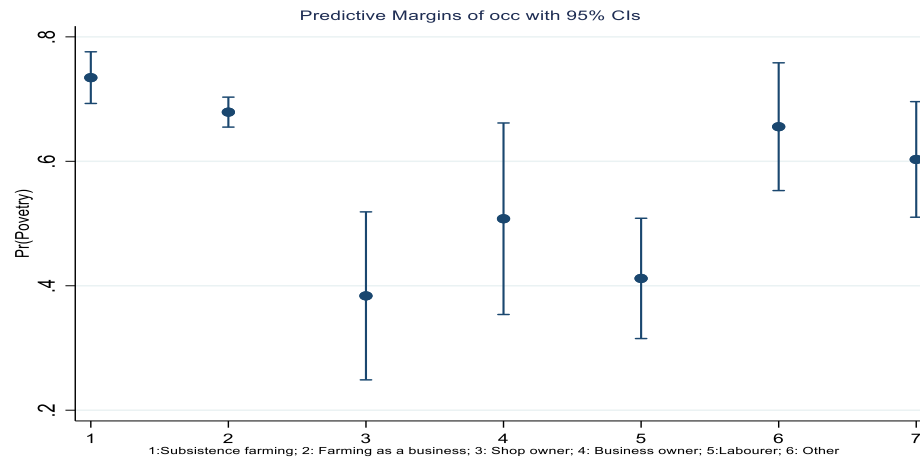


Table 1. Household members' income circumstances.

Variable	A) Ordered logit	B) M.E. (Ordered logit)			C) M.E. (Generalised ordered logit)		
	Coef.	Don't make enough	Breaking even	Surplus	Don't make enough	Breaking even	Surplus
Base occupational category (Subsistence farming)							
Farming as a business	0.484*** (0.089)	-0.058*** (0.011)	-0.014*** (0.003)	0.073*** (0.013)	-0.058*** (0.011)	-0.014*** (0.003)	0.073*** (0.013)
Professional, i.e., doctor, teacher, nurse	0.942*** (0.258)	-0.081*** (0.015)	-0.023*** (0.005)	0.105*** (0.020)	-0.082*** (0.015)	-0.023*** (0.005)	0.105*** (0.020)
Shop owner	0.562* (0.326)	-0.055** (0.025)	-0.015** (0.008)	0.070** (0.033)	-0.038 (0.031)	-0.035*** (0.010)	0.073** (0.032)
Business owner	0.702*** (0.201)	-0.066*** (0.015)	-0.018*** (0.005)	0.085*** (0.019)	-0.067*** (0.015)	-0.018*** (0.005)	0.085*** (0.019)
Laborer	0.065 (0.169)	-0.008 (0.019)	-0.002 (0.005)	0.010 (0.024)	-0.008 (0.019)	-0.002 (0.005)	0.010 (0.024)
Other	0.202 (0.144)	-0.023 (0.015)	-0.006 (0.004)	0.028 (0.019)	-0.023 (0.015)	-0.006 (0.004)	0.028 (0.019)
Male	-0.134 (0.084)	0.016 (0.010)	0.004 (0.002)	-0.020 (0.012)	0.016 (0.010)	0.004 (0.002)	-0.020 (0.012)
Age	-0.005 (0.003)	0.001 (0.000)	0.000 (0.000)	-0.001 (0.000)	0.001 (0.000)	0.000 (0.000)	-0.001 (0.000)
Single/Never married	-0.487*** (0.100)	0.063*** (0.014)	0.015*** (0.003)	0.078*** (0.017)	0.064*** (0.014)	0.015*** (0.003)	0.078*** (0.017)
Attended school	-0.070 (0.106)	0.008 (0.012)	0.002 (0.003)	-0.010 (0.015)	0.008 (0.012)	0.002 (0.003)	-0.010 (0.015)
Urban area	0.119	-0.014	-0.004	0.017	-0.014	-0.004	0.017

	(0.104)	(0.012)	(0.003)	(0.015)	(0.012)	(0.003)	(0.015)
Region (Western)							
Central	0.660***	-0.068***	-0.018***	0.087***	-0.068***	-0.018***	0.087***
	(0.116)	(0.010)	(0.003)	(0.013)	(0.010)	(0.003)	(0.013)
Eastern	0.301***	-0.034***	-0.009***	0.043***	-0.034***	-0.009***	0.043***
	(0.093)	(0.010)	(0.003)	(0.013)	(0.010)	(0.003)	(0.013)
Northern	0.432***	-0.047***	-0.012***	0.059***	-0.047***	-0.012***	0.059***
	(0.106)	(0.010)	(0.003)	(0.013)	(0.010)	(0.003)	(0.013)
Log likelihood	-2801.180						
Probability		0.138	0.044	0.818	0.138	0.044	0.818
Observations	4,869						

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

When Age² was included in the model, the coefficient of Age was not anymore statistically significant. Standard errors are in parentheses.

Table 2. Household member's economic well-being.

Variable	A) Ordered logit - Full sample Coef.	B) Ordered logit - Urban area Coef.	C) Ordered logit - Rural area Coef.
Base occupational category (Subsistence farming)			
Farming as a business	0.273*** (0.070)	0.161 (0.196)	0.290*** (0.075)
Professional, i.e., doctor, teacher, nurse	1.278*** (0.160)	1.080*** (0.273)	1.359*** (0.211)
Shop owner	0.712*** (0.224)	0.207 (0.379)	1.041*** (0.287)
Business owner	0.882*** (0.133)	1.053*** (0.263)	0.784*** (0.159)
Laborer	-0.108 (0.138)	0.043 (0.279)	-0.188 (0.164)
Other	0.488*** (0.112)	0.556** (0.239)	0.442*** (0.130)
Male	0.296*** (0.063)	0.258* (0.144)	0.289*** (0.070)
Age	-0.006*** (0.002)	0.011* (0.006)	-0.010*** (0.002)
Single/Never married	-0.080 (0.077)	0.366** (0.182)	-0.172** (0.085)
Attended school	0.445*** (0.079)	1.041*** (0.225)	0.373*** (0.085)
Urban area	0.305*** (0.073)		
Region (Western)			
Central	0.725*** (0.081)	0.549*** (0.174)	0.774*** (0.092)
Eastern	-0.245*** (0.072)	-0.247 (0.179)	-0.230*** (0.080)
Northern	-0.553*** (0.081)	-0.479** (0.221)	-0.549*** (0.087)
Log likelihood	-5,230.16	-995.88	-4,219.62
Observations	4,829	880	3,949

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

When Age2 was included in the model, the coefficient of Age was not anymore statistically significant. Standard errors are in parentheses.

Table 3. Marginal effects of the household member's economic well-being ordered logit model.

Category:	We don't have enough money for food	We have enough money for food and clothes only	We can also save a bit but not enough to buy expensive goods	We can afford to buy certain expensive goods
Variable	Full			
Base occupational category (Subsistence farming)				
Farming as a business	-0.061*** (0.016)	0.015*** (0.004)	0.041*** (0.010)	0.005*** (0.001)
Professional, i.e., doctor, teacher, nurse	-0.216*** (0.019)	-0.061*** (0.022)	0.235*** (0.031)	0.043*** (0.009)
Shop owner	-0.137*** (0.036)	-0.006 (0.016)	0.125*** (0.043)	0.018** (0.008)
Business owner	-0.166*** (0.020)	-0.014 (0.012)	0.157*** (0.026)	0.024*** (0.005)
Laborer	0.024 (0.032)	-0.007 (0.010)	-0.016 (0.020)	-0.002 (0.002)
Other	-0.100*** (0.021)	0.008** (0.003)	0.081*** (0.020)	0.011*** (0.003)
Urban				
Base occupational category (Subsistence farming)				
Farming as a business	-0.029 (0.035)	-0.006 (0.008)	0.029 (0.035)	0.006 (0.007)
Professional, i.e., doctor, teacher, nurse	-0.152*** (0.029)	-0.104*** (0.040)	0.197*** (0.046)	0.058*** (0.022)
Shop owner	-0.036 (0.062)	-0.010 (0.024)	0.038 (0.071)	0.008 (0.016)
Business owner	-0.150***	-0.099***	0.193***	0.056***

	(0.029)	(0.038)	(0.045)	(0.021)
Laborer	-0.008	-0.001	0.008	0.002
	(0.050)	(0.010)	(0.050)	(0.010)
Other	-0.091***	-0.036	0.103**	0.024*
	(0.035)	(0.023)	(0.045)	(0.013)
			Rural	
Base occupational category (Subsistence farming)				
Farming as a business	-0.067***	0.021***	0.041***	0.004***
	(0.017)	(0.006)	(0.011)	(0.001)
Professional, i.e., doctor, teacher, nurse	-0.236***	-0.053*	0.250***	0.039***
	(0.024)	(0.029)	(0.042)	(0.011)
Shop owner	-0.194***	-0.018	0.187***	0.025**
	(0.040)	(0.029)	(0.058)	(0.011)
Business owner	-0.157***	0.007	0.134***	0.016***
	(0.027)	(0.010)	(0.031)	(0.005)
Laborer	0.044	-0.016	-0.026	-0.002
	(0.039)	(0.016)	(0.021)	(0.002)
Other	-0.095***	0.017***	0.070***	0.008***
	(0.026)	(0.002)	(0.023)	(0.003)

* p<0.10, ** p<0.05, *** p<0.01. Standard errors are in parentheses.

Table 4. Marginal effects of the household member's economic well-being generalised ordered logit model.

Category:	We don't have enough money for food	We have enough money for food and clothes only	We can also save a bit but not enough to buy expensive goods	We can afford to buy certain expensive goods
Variable	Full			
Base occupational category (Subsistence farming)				
Farming as a business	-0.059*** (0.015)	0.014*** (0.004)	0.041*** (0.011)	0.004*** (0.001)
Professional, i.e., doctor, teacher, nurse	-0.215*** (0.018)	-0.067*** (0.023)	0.242*** (0.032)	0.040*** (0.009)
Shop owner	-0.096* (0.053)	-0.048 (0.058)	0.076 (0.051)	0.068** (0.029)
Business owner	-0.158*** (0.027)	-0.021 (0.033)	0.128*** (0.032)	0.050*** (0.016)
Laborer	0.022 (0.031)	-0.006 (0.009)	-0.015 (0.020)	-0.002 (0.002)
Other	-0.101*** (0.021)	0.007* (0.004)	0.084*** (0.021)	0.010*** (0.003)
Urban				
Base occupational category (Subsistence farming/Farming as a business)				
Professional, i.e., doctor, teacher, nurse	-0.136*** (0.025)	-0.099*** (0.035)	0.187*** (0.043)	0.048*** (0.017)
Shop owner	-0.015 (0.060)	-0.004 (0.020)	0.017 (0.067)	0.003 (0.012)
Business owner	-0.133*** (0.024)	-0.093*** (0.032)	0.181*** (0.041)	0.045*** (0.016)
Laborer	0.017	0.003	-0.017	-0.003

	(0.044)	(0.007)	(0.043)	(0.007)
Other	-0.072**	-0.031*	0.085**	0.017*
	(0.028)	(0.019)	(0.037)	(0.009)
			Rural	
Base occupational category (Subsistence farming)				
Farming as a business	-0.066***	0.021***	0.041***	0.004***
	(0.017)	(0.006)	(0.011)	(0.001)
Professional, i.e., doctor, teacher, nurse	-0.240***	-0.062**	0.265***	0.037***
	(0.023)	(0.031)	(0.044)	(0.011)
Shop owner	-0.157***	-0.022	0.033	0.146***
	(0.061)	(0.073)	(0.067)	(0.056)
Business owner	-0.134***	-0.029	0.103***	0.060***
	(0.035)	(0.040)	(0.037)	(0.021)
Laborer	0.047	-0.025	-0.046	0.024
	(0.042)	(0.040)	(0.030)	(0.016)
Other	-0.096***	0.017***	0.072***	0.007***
	(0.026)	(0.003)	(0.023)	(0.003)

* p<0.10, ** p<0.05, *** p<0.01.

^For the Urban area sample differentiating between subsistence farming and farming as a business led to three in-sample cases to have a predicted probability that is less than zero. However, increasing the number of observation in the reference category by merging these variables overcame this problem. Standard errors are in parentheses.

Table 5. A household member below poverty line model.

	A) Probit - Full sample	B) Probit - Urban area	C) Probit - Rural area	D) Probit - Full sample	E) Probit - Urban area	F) Probit - - Rural area
	Coef.	Coef.	Coef.	M.E.	M.E.	M.E.
Base occupational category (Subsistence farming)						
Farming as a business	-0.141*** (0.054)	-0.381*** (0.141)	-0.093 (0.059)	-0.050*** (0.019)	-0.138*** (0.050)	-0.029 (0.018)
Professional, i.e., doctor, teacher, nurse	-0.981*** (0.122)	-1.372*** (0.235)	-0.857*** (0.149)	-0.376*** (0.044)	-0.346*** (0.032)	-0.320*** (0.058)
Shop owner	-1.001*** (0.176)	-1.123*** (0.363)	-0.972*** (0.203)	-0.383*** (0.062)	-0.295*** (0.053)	-0.366*** (0.078)
Business owner	-0.995*** (0.101)	-1.295*** (0.226)	-0.934*** (0.114)	-0.381*** (0.036)	-0.338*** (0.034)	-0.349*** (0.044)
Laborer	-0.247** (0.103)	-0.714*** (0.217)	-0.097 (0.121)	-0.092** (0.040)	-0.223*** (0.053)	-0.032 (0.041)
Other	-0.270*** (0.084)	-0.596*** (0.181)	-0.189* (0.097)	-0.100*** (0.032)	-0.197*** (0.051)	-0.063* (0.034)
Male	-0.045 (0.047)	-0.181 (0.112)	0.001 (0.052)	-0.016 (0.017)	-0.067 (0.042)	0.000 (0.017)
Age	-0.002 (0.002)	-0.005 (0.004)	-0.001 (0.002)	-0.001 (0.001)	-0.002 (0.002)	-0.000 (0.001)
Single/Never married	-0.110* (0.057)	-0.320** (0.146)	-0.067 (0.062)	-0.040* (0.021)	-0.114** (0.049)	-0.021 (0.020)
Attended school	-0.514*** (0.061)	-0.654*** (0.164)	-0.484*** (0.067)	-0.168*** (0.018)	-0.252*** (0.064)	-0.141*** (0.017)
Urban area				-0.276*** (0.021)		
Region (Western)						
Central	-0.498***	-0.259*	-0.538***	-0.186***	-0.094*	-0.187***

	(0.057)	(0.146)	(0.063)	(0.022)	(0.051)	(0.024)
Eastern	0.476***	0.946***	0.370***	0.159***	0.358***	0.111***
	(0.053)	(0.134)	(0.058)	(0.016)	(0.049)	(0.016)
Northern	0.929***	1.008***	0.920***	0.272***	0.386***	0.236***
	(0.067)	(0.162)	(0.074)	(0.015)	(0.058)	(0.014)
Constant	1.098***	0.722**	1.020***			
	(0.105)	(0.287)	(0.112)			
Log likelihood	-2,436.47	-418.6011	-1,999.96	-2,436.47	-418.6011	-1,999.96
Probability				0.689462	0.350665	0.751487
Observations	4,869	883	3,986	4,869	883	3,986

* p<0.10, ** p<0.05, *** p<0.01.

When Age2 was included in the model, the coefficient of Age was not anymore statistically significant. Standard errors are in parentheses.

Table 6. MMWS estimates.

	Household members' income circumstances	Household member's economic well-being	Poverty
	Coef.	Coef.	Coef.
Base occupational category (Subsistence farming)			
Farming as a business	0.518*** (0.105)	0.155* (0.086)	-0.132** (0.064)
Professional, i.e., doctor, teacher, nurse	0.663* (0.376)	1.230*** (0.202)	-0.833*** (0.168)
Shop owner	0.985** (0.434)	0.302 (0.604)	-0.640*** (0.234)
Business owner	0.647** (0.256)	0.832*** (0.187)	-0.940*** (0.124)
Laborer	0.155 (0.216)	0.093 (0.157)	-0.320** (0.125)
Other	0.199 (0.190)	0.368** (0.148)	-0.318*** (0.115)
Controls	Yes	Yes	Yes
Log likelihood	-2175.6294	-4,156.84	-2,096.88
Observations	3,786	3,748	3,786

* p<0.10, ** p<0.05, *** p<0.01. Standard errors are in parentheses.