Why People are Moving Out of Agriculture: Micro-Evidence from Uganda and Ethiopia

by

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Abstract: This paper studies the determinants shaping the likelihood of being active in the non-farm sector in the rural economies of Sub-Saharan Africa. More specifically, the push, pull and capacity factors for a cross-sectional sample of rural Uganda and Ethiopia are explored. Using the newest nationally representative household surveys from 2015/16 for both countries, the determinants are examined for 2770 and 3027 individuals respectively. The analysis is conducted by specifying a Multinomial Logit Model to account for the three different categories the dependent variable can fall into, namely farm employment, non-farm wage employment and non-farm self-employment. The literature so far tends to conclude that several different factors affect the likelihood to engage in these activities, which is confirmed in this study. In addition to capacity variables, such as the level of human capital and initial wealth, the findings suggest that factors such as gender, age, access to markets, information, bank accounts and land holdings, appear to be of importance for the likelihood of being employed in non-farm activities. The study concludes that strengthening capacity factors could be important. However, this alone will not lead to a pull-factor led economic transformation in either of the countries without improvements related to push and pull factors.

Keywords: Rural Non-Farm Economy, Ethiopia, Uganda, Push Factors, Pull Factors, Capacity Factors, Multinomial Logit Model

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Abbreviations

CSA	Central Statistics Agency of Ethiopia
ESS	Socioeconomic Survey for Ethiopia
IFAD	International Fund for Agricultural Development
IIA	Independence of Irrelevant Alternatives
LSMS-ISA	Living Standards Measurement Study - Integrated Surveys on Agriculture
MNL	Multinomial Logit Model
OECD	Organisation for Economic Cooperation and Development
NHS	National Household Survey for Uganda
UBOS	Uganda Bureau of Statistics

1   Introduction

African Economies have been enjoying significant economic growth rates over the past 20 years, often surpassing 5% of growth per year, which has sparked hope for a sustained path out of the low-income status and high poverty rates (European Parliament, 2016). Whether or not this foundation has been built on solid ground has been discussed widely in the literature on the subject. To understand this process better, scholars have published several studies examining the underlying pattern of structural transformation. Theoretically, the structural transformation process is defined as the move away from agriculture towards more modern sectors, first manufacturing and then services, through continuously upgrading into higher value-added activities (Estudillo, Cureg & Otsuka, 2019). As a result, the transformation constitutes a long-term change of the economy, backing income growth and poverty reductions by augmenting productivity, migration towards urban centres, and offering new employment opportunities. These aspects are an essential part of the structural change literature, but it remains unclear as to which of these sectors plays a greater role in driving the structural transformation process, and this debate can be broadly categorised by two schools of thought (Barrett, Christiaensen, Sheahan & Shimeles, 2017). Whereas classic models like Lewis' (1954) stress the role of the modern sector, many other theories emphasise agricultural productivity as principally important to initiating structural change (Alvarez-Cuadrado & Poschke, 2011).

While many researchers within the field argue that increasing productivity, income and output in the agriculture sector can act as a catalyst for the overall structural transformation and economic development, other views on this have evolved. A number of scholars reason that Sub-Saharan Africa would benefit from an alternate route to structural transformation. This is partly due to constraints faced by the region's agricultural sector (Ellis, 2005). Several studies have concluded that the sector partly lacks increasing productivity, market structures, and capital, among other factors, needed for a transformation comparable to the Green Revolution in Asia (Barrett, Reardon & Webb, 2001; Ellis, 2005). Furthermore, a rise in output is produced by increasing cultivated land areas rather than actual yield growth and the region faces differing global economic structures (Reardon & Timmer, 2005; Jirström, Andersson & Djurfeldt, 2011). As a result, a discussion of alternative ways out of poverty have emerged, which more greatly consider these structural restraints. One part of this field is the theory of income diversification that includes the rural labour markets (World Bank, 2007). The rural non-farm economy is here defined as all of the income-generating activities that are located in the rural areas of a country which are not directly agricultural (Davis & Bezemer, 2004). Diversification beyond the farming sector is pointed out by some authors (see for example Haggblade, 2007) as a vital driver of rural growth and positive effects on the agrarian sector itself. Within the process of structural transformation, various factors, which determine why

people move out of agriculture and into the rural non-farm sector, are at play. These can be divided into two groups, namely push and pull factors. The former refers to how individuals are pushed out of agriculture, for example, due to insufficient income from agricultural activities, while the latter describes how the non-farm sectors attract labour and investments, typically though rising incomes. The pull can, furthermore, stem from increased capabilities, also called capacity factors, such as an increasing level of human capital accumulation. Hence, capabilities, such as human, financial and social capital, play a vital role in this dynamic. While these factors have not always been explicitly mentioned in the literature, they have long been implicit within the models produced by researchers on the topic, including the foundational literature on the theory of structural transformation. For instance, Lewis (1954) described the rising wages in the modern sector, caused by capital accumulation, as the main incentive for workers to move out of agriculture, which can be categorised as a pull factor.

Despite its potential importance for the economic development and the poverty reduction process, as well as having been subject to growing scholarly attention, comprehensive and comparative analyses of the determinants of the push, pull and capability factors in rural Sub-Saharan Africa have only started to emerge in recent years and have produced mixed conclusions. This is somewhat remarkable considering it has been estimated that, according to the most recent National Household Survey from 2015/16, 75% of the working population resided in rural areas in Uganda (UBOS, 2018), where agriculture remains the most important source of income. Similarly, around 82% of Ethiopia's population lived in rural areas in 2013 (Schmidt & Bekele, 2016). Given the centrality of rural incomes to the livelihoods of these populations, the prevailing focus on the modern sector fails to acknowledge this. There is, therefore, significant value to be found in a study, which focuses on the rural economies of Sub-Saharan African nations, and so this thesis will specifically study those of Uganda and Ethiopia. This will be used as the departure point with the two rural economies at the centre of the research.

1.1   Research Gap and Problem

The research gap partly stems from the issues created by structural transformation studies, which fail to make an adequate distinction between different income sources within the rural economy (Oya & Pontara, 2015, pp. 5-6). According to Reardon, Berdegué, Barrett & Stamoulis (2007), a growing income share is generated in rural non-farm activities across developing countries. However, as Oya (2010) describes, the Sub-Saharan African rural labour markets are seen as thin and tend to be characterised by broad stylised facts. Studies published on the transformation of the Sub-Saharan African economies have to a large extent focused on the development of the urban sectors and the agricultural sector itself. Consequently, less is known about the dynamics of the rural labour markets in the region and the factors behind the dynamics (Oya & Pontara, 2015, pp. 5-6). Bezu, Barrett & Holden (2014) note the general lack of acknowledgement of the diversity of the income structure and

employment opportunities and call for a disaggregated analysis beyond the functional classification widely used in the literature.

Within the research field, another element contributing to the research gap is the difficulty in disentangling push, pull and capability factors, meaning they are a growing but understudied topic for many developing and emerging economies (Barrett et al., 2017). For example, activity diversification can take place into high-return or low-return sectors and be due to push or pull factors and be impacted by capabilities, such as the acquired level of human capital (Bezu, Barrett & Holden, 2012). Available opportunities and motives usually depend on the level of income and the individual case, making a distinction between the three factors necessary to understand the patterns of development (Reardon et al., 2007). For instance, diversification due to pulling factors is usually associated with an increasing income level and assets, which makes it a vital issue for the transformation of the economy as a whole. Besides that, leaving agriculture due to pull factors can help to build the capacity to save and reinvest, thereby strengthening the financial capabilities of an individual and offering a way out of poverty. These factors make this a highly relevant topic to study (Oya, 2010; Davis, Di Giuseppe & Zezza, 2017) and examining this relationship has the potential to yield important lessons for the development process in Sub-Saharan Africa, including implications for the future. Hence, whether push or pull determine the process of individuals leaving agriculture in rural Uganda and Ethiopia and how capabilities impact this decision is the research problem for this thesis.

Therefore, the importance of further research on the topic is motivated by the existing research gap, including the fact that studies so far have been limited and have come to mixed conclusions by suggesting the importance of different factors. While it can be assessed that there exists an increasing recognition in the literature of the importance of these factors and an increasing number of studies on the topic can be found, the evidence on the rural non-farm economy and shaping factors is far from being conclusive or available as usually not available as comparative studies. Here, it is important to mention that the literature most typically focuses on large cross-country or case studies of specific areas within a country (Nagler & Naudé, 2017). Additionally, new household survey data for 2015/16 is available for Ethiopia and Uganda that has not yet been used extensively and so offers the chance to update the findings of earlier studies.

1.2 Aim, Objective and Scope

Describing the research gap illustrates that further research of the rural non-farm economy in Sub-Saharan Africa is needed. Since the rural transformation is a complex topic with many factors playing a role, the research focus has been narrowed down to provide a more in-depth analysis. The perspective chosen for this specific analysis is to look at the determining factors behind sector and employment developments in rural areas. Subsequently, this thesis aims to

complement the existing research by targeting a better understanding of whether the recent economic success of the region has been translated into the pull factor associated transformation of the rural labour markets. More specifically, the purpose is to explore the available household survey data on the determinants of the employment diversification in Uganda and Ethiopia and compare their experiences. These two countries are obvious choices for the study as both have been economically successful since the early 2000s with sustained growth rates often exceeding 5% per year and a declining contribution of the agriculture sector (Dorosh & Thurlow, 2014). At the same time, Ethiopia and Uganda remain agriculture-based economies with a majority of the population remaining in rural areas (Dorosh & Thurlow, 2014). This suggests that the non-farming rural sector may have played a significant role in their economic success and that a closer study of the new household survey data will help to shed light on the extent to which this has been the case. Additionally, structural transformation in African countries is a central topic for the policy debate, making the examination of two country cases within the region especially valuable. The last point that motivated the sample choice was the availability of newly available data in the form of comparable household surveys for both countries. Based on this, Uganda and Ethiopia have been chosen, not only because of data availability but also due to the mostly rural-based population and the growth of the economy in recent years. Following from this, the research question asks:

Are people moving into employment in the non-farm sector because of push, pull or capacity factors in rural Uganda and Ethiopia?

To address this, a quantitative research approach is chosen using nationally representative household survey data from the 2015/16 survey for both countries, which are part of the Living Standards Measurement Study - Integrated Surveys on Agriculture (LSMS-ISA) programme. In the main part of the analysis, the investigation attempts to reveal which factors drive the decision to engage in non-farm economic activities. These are distinguished into push, pull and capacity factors and analysed empirically by using descriptive statistics and Multinomial Logit (MNL) regressions to understand the role of determinants in this context.

The objective of the thesis is to provide empirical evidence on the significance of push and pull factors in the move out of agriculture observed in Sub-Saharan Africa and examine the role of capability/capacity variables, such as financial capital, in this process further. More precisely, the topic is explored using the two cases of Uganda and Ethiopia. The analysis is intended to present the complexity of the rural labour market structure and its determinants by considering factors such as being in non-farm wage employment or self-employed. This contributes to the research field in the following ways: First, the conception of the rural sector in developing and emerging economies according to traditional theories of structural transformation is challenged by illustrating its complex structure with descriptive statistics calculated using the national household surveys for each country. Here an advantage lies in the fact that the thesis can draw on newly available data from the surveys conducted in 2015/16, thereby updating earlier results. Using cross-sectional data is motivated by the scope of this thesis, making it necessary to focus on these two datasets. Hence, the study proposes

suggestive evidence rather than a causal relationship but an advantage lies in the fact that it can be directly connected to earlier findings for Uganda and Ethiopia. Second, the thesis offers a comparative study of Uganda and Ethiopia, which is an understudied area within this field and offers insights into the differences and similarities of these rural labour markets. This contributes to the literature by putting the results into perspective and showing to what extent general conclusions can be drawn from country cases. As a result, this study should be seen as complementary to other research in the field. It is not within this scope to show whether or not the non-farm opportunities yield higher returns or picture the long-term development. Instead, the focus here lies on the determining factors and the comparison between the significant factors in Ethiopia and Uganda. This potentially yields important lessons for policymakers about the rural non-farm economy and the future of the development process (Reardon et al., 2007; Oya, 2010).

1.3   Outline of the Thesis

The thesis proceeds as follows: The first part presents a literature review on the structural change process Sub-Saharan Africa, Uganda and Ethiopia, with a focus on studies that have examined the role of rural labour markets in the region. Then, a section follows that outlines the key ideas when it comes to decisive factors of rural labour market transformations and establishes the theoretical concept needed for the analysis of the push and pull factors. This is followed by a description and critical review of the used data. The next chapter deals with the collected evidence and presents the first basic calculations to provide an overview of the rural economies. Thereafter, the results of the regressions concerning the push and pull factors are presented. This is put into context by following the chapter up with an analysis and discussion of the evidence. In the last part, the thesis' findings are summarised and possible directions for future research are presented.

2   Literature Review

2.1   Evidence for Sub-Saharan Africa

Generally, an increasing share of income is produced in the rural non-farm economy in Sub-Saharan Africa. For instance, Haggblade, Hazell & Reardon (2010) estimate that between 35% and 50% of incomes in the region are generated in non-farm employment. Similarly, Diao, Harttgen, & McMillan (2019) show that the labour force participation in rural non-farm activities has risen significantly. More than 80% of the additional jobs were created in the non-farm sector were accompanied by a substantial rise in labour productivity in Tanzania between 2002 and 2012. This illustrates the growing importance of the rural non-farm economy and within this field, a number of factors have been identified as determining factors, however, with varying conclusions about the role of push, pull and capability factors.

One illustrative example for push factors is Losch, Fréguin-Gresh & White's (2012) paper presenting the results for the RuralStruc programme, which puts micro evidence for structural change with a macrostructural view at the centre of its research. In their survey of Mali, Senegal, Madagascar and Kenya they come to the conclusion that while income diversification can be observed, within many African countries there remains a struggle to generate enough income for a secure livelihood within this process. They attribute this to the low returns for non-farm employment opportunities, which hinders the transformation process in the region and possibly leads to structural poverty, thereby indicating the importance of push factors. Additionally, they assess that the extent depends on the agricultural potential, market access, infrastructure and the distance to urban areas of an area matter in this context. Another example is presented by Djurfeldt & Djurfeldt (2013), who use longitudinal data from 2,354 smallholder farmers in eight African countries and discuss how the returns to non-farm activities have been low in many Sub-Saharan countries compared to agriculture activities. As a result, this and other studies (see for instance Barrett, Reardon & Webb, 2001; Rigg, 2006; Haggblade, Hazell & Reardon, 2010) explain how the diversification patterns can be assigned to income smoothing and push factors rather than following new opportunities. Studying the labour employment and productivity gaps in the region by decomposing household survey data, McCullough (2017) similarly finds that the pull from other sectors is not as strong as required to absorb the excess labour in agriculture.

In contrast, other authors describe a positive trend with evidence for an intense transformation of non-farm activities since the early 2000s. One example here is the review study conducted by Jayne, Chamberlin & Benfica (2018). They claim that the economic growth rates are driven by substantial progress of agriculture and new employment opportunities in off-farm

employment, indicating the importance of pull factors. Likewise, Van den Broeck & Maertens (2017) analyse panel data and conduct a cluster analysis for Senegal River Delta to find out more about the determinants. They conclude that particularly poorer households moved out of agriculture, which stands in contrasts to findings for other regions. Explanations for this stress pull factors, such as being located close to employment opportunities and the family labour size. This also indicates that, at least in this specific region, employment opportunities are available.

The extent to which a household is able to move out agriculture due to its financial capabilities is a factor that needs to be taken into account when analysing the determinants since it is closely related to the topic of push and pull factors. Agriculture-based employment and income seem to remain the dominating factor so far, which is particularly the case for poorer households (Davis, Di Giuseppe & Zessa, 2014). It has been shown that poorer farmers struggle with access to non-farm employment. For instance, Djurfeldt (2012) shows that poorer households in two villages in Western Kenya lack the opportunity to move out of agriculture compared to wealthier farmers, thereby, becoming more vulnerable to negative push factors, such as seasonality of agriculture. Furthermore, Ellis & Freeman (2004) show, for a sample of Kenya, Tanzania, Malawi and Uganda, that worse-off households often follow a vicious spiral due to initially low levels of land, livestock and financial asset holdings. This is particularly an issue for high-return activities since entry barriers are higher for these occupations. This illustrates that market access and income, among other characteristics, are vital determinants of the labour reallocation process, a fact that has to be taken into account in this analysis. The relationship, for example, also depends on agro-climatic conditions because favourable environments make it more likely for individuals to remain in agriculture-related occupations (Davis, Di Giuseppe & Zessa, 2014). Using 41 comparable household surveys from 22 countries in Sub-Saharan Africa to understand the income diversification patterns, Davis, Di Giuseppe & Zessa (2014) find that location and geographical features generally matter in the diversification process. This could also have implications for the long-term transformation since a more productive agrarian sector drives the development of the non-farm sector as well as urbanisation, possibly leaving some regions behind. This is also suggested by Jayne, Chamberlin & Benfica (2018), arguing that the transformation is unfolding unevenly across the region and that doubts about the sustainability of the progress remain. Other studies indicate that the lack of land ownership pushes people in Sub-Saharan Africa out of agriculture (see for instance Bezu, Barrett & Holden, 2014). This shows that capabilities relating to assets, the level of human capital, social capital and the similar, might be of importance here and should be taken into account.

Consequently, it appears the issue is characterised by a high complexity caused by interlinkages and a number of characteristics on the household, community and macroeconomic level can be identified as determinants. Furthermore, significant factors impact the forces of push and pull themselves, such as a lack of market access due to poverty. This directly relates to the role of capability factors in the decision to move to employment activities outside of agriculture. In many cases, the move out of agriculture might also be determined simultaneously by push and pull factors and appear to depend highly on the local

context. For example, Nagler & Naudé (2017) analyse data from the LSMS-ISA surveys between 2005 and 2013 for Ethiopia, Malawi, Niger, Nigeria, Tanzania and Uganda. They show that the non-farm sector lags behind in the rural areas of these countries. Concerning the push and pull factors, they observe that both sides matter for the decision to leave agriculture. For example, for Malawi the incidence of shocks is significantly related to the likelihood of becoming an entrepreneur. Likewise, shocks impact the decision to reallocate labour since a lack of insurance and credit markets limits the ability to absorb the impact. At the same time, market demand factors, proxied by distance to urban centres and local infrastructure, as well as education of the household head are decisive aspects.

Overall, the existing evidence on the rural income diversification and the determining factors in Sub-Saharan Africa provides a mixed, partly contradicting, view on which of the elements, push or pull, have been determining the move out of agriculture since the early 2000s. One interesting factor are the capabilities of individuals or households, which appear to play a significant role in determining the decision to work outside of agriculture. This illustrates the need for further research looking into the drivers and patterns of the rural transformation to generate new insights on the depth of the process. Firstly, this will be examined in more depth by reviewing the literature on the cases of Uganda and Ethiopia. Second, these identified aspects will be taken into account for this analysis as much as possible to provide a comprehensive analysis.

2.2   Evidence for Ethiopia and Uganda

In accordance with the section on Sub-Saharan Africa in general, Bachewe, Berhane, Minten & Taffesse (2016) explain that the rapid economic transformation in Ethiopia has been translated into the increasing importance of the off-farm sector in rural areas. Wage employment and enterprises comprised 19% of the total rural income with a 54% rise in rural wages over the studied period from 2004 to 2014. Correspondingly, Estudillo, Cureg & Otsuka (2019), studying the employment trends in Uganda and Ethiopia, analyse that incomes from farm employment remained the most important income source until the end of the studied period in 2008. Despite this, a rising trend in non-farm employment and income diversification was observed at this point already. When it comes to the push and pull factors, studies emphasising both sides can be found and therefore, the review for Ethiopia and Uganda is divided into these sections.

Similar to the literature review on the whole region, a number of studies contest that the move out of agriculture is motivated primarily by pull factors. This strand of research indicates that the rural labour market might not be driven by agricultural productivity gains and that other studies overstate the importance and safety of non-farm employment. The Rural Development Report from 2016 indicates that Ethiopia experiences a rapid transformation of the rural sector (IFAD, 2016). However, this does not necessarily stem from productivity increases. In this case, the total factor productivity of the agriculture sector, a measure for efficiency or

productivity, has been shown to grow slower during periods of rapid economic growth compared to other parts of the world. This suggests that people might be pushed out of agriculture. Haggblade, Hazell, Reardon (2010) provide further evidence on this by stressing that employment in rural non-farm activities highly depends on the season and the availability of materials for agrarian activities. This is also due to the fact that farm and non-farm engagement often go hand in hand. Individuals might use non-farm opportunities to substitute for a lack of income from agricultural products during the off-season, to finance the purchase of new (agricultural) assets or to diversify risks (Haggblade, Hazell, Reardon, 2010). For example, Schmidt & Bekele (2016) also show in their analyses that the structural change in Ethiopia's rural areas is limited, particularly due to low demand in the non-farm sector of the rural economy. Another example is the study by Matsumoto, Kijima & Yamano (2006) using household data for both, Ethiopia and Uganda, which was collected in 2003 and 2004. There, households in less favourable areas are more likely to move out of agriculture, illustrating how low returns to agriculture push individuals out of the sector. Other mentioned characteristics relating to push factors in the literature are rural population growth and low productivity in the agriculture sector (Weldegebriel, Folloni & Prowse, 2015; Asfaw, Simane, Hassen & Bantider, 2017). Some researchers (see for instance Dorosh & Thurlow, 2014) also describe the increasing urbanisation that takes place in Uganda and Ethiopia as worrying due to an increasing share of poverty in these centres. This is confirmed by Estudillo, Cureg & Otsuka (2019), who describe many of the non-farm work opportunities that take place in the informal low-return sector. This reflects that rather than being attracted by pull factors, such as high return employment opportunities, the opposite might be true.

In contracts to this, a limited number of studies has been published stressing the importance of pull factors. Deressa, Hassan & Ringler (2008) find that access to technology as well as infrastructure plays a role in the income diversification process. A second example is the panel estimation of the Ethiopian Rural Household Surveys by Weldegebriel, Folloni & Prowse (2015). Their findings suggest that demand-related factors, such as increasing consumption, are responsible for the decision to leave agriculture in the country. A recent OECD (2020) study for Ethiopia also acknowledges that the newly established intermediary towns reflect that pull factors drive the move out of agriculture. This is done by promoting market linkages and employment opportunities outside of agriculture that attracts rural households.

Interestingly, there is another set of articles highlighting the role of both factors simultaneously. For example, Amare & Shiferaw (2017) show with panel data from the LSMS-ISA for Uganda that agricultural shocks make individuals more likely to leave agriculture. At the same time, human capital accumulation also increases the likelihood, presenting that the pattern not necessarily follows one side of factors only. In this context, it has also been argued that the set of factors determining the move out of agriculture in Ethiopia depends on the activity and other factors, such as gender (Bezu, Barrett & Holden (2014). Low-return non-farm occupations, for example food and beverage production, generally appear to be determined by push factors. The exception here is education, which

affects participation in both activities and this effect is even stronger for women, who usually tend to be affected by push factors (Bezu, Barrett & Holden, 2014). Similarly, Matsumoto, Kijima & Yamano (2006) confirm the role of human capital and assets as determinants of non-farm employment. These findings are not surprising considering that the presented literature review for the whole region indicated that initial capabilities and assets play a significant role in the move out of agriculture. Hence, there might be a reinforcing sequence of events, where poorer households have a higher incentive to move out of agriculture because of distress-push factors. At the same time, they face higher constraints and are stuck in a survival strategy. In contrast to this, wealthier households can be pulled to new employment opportunities since they are able to use their initial capabilities and face fewer constraints. Furthermore, and in accordance with the literature in the section before, the evidence also remains mixed for Ethiopia and Uganda. While some factors have been identified as crucial in a majority of studies, such as human capital, other factors are still debated and the importance of push and pull factors depends on the study. As a result, it is important to incorporate the physical, financial, social and human capital into the framework and the analysis, if possible.

Based on the findings in the literature, it is clear that the topic is complex, with intertwined factors specifically related to the context of individual studies. Additionally, it can be concluded that a number of aspects have been identified in the literature as influential. This ranges from age, household size, sex, initial capital-related aspects, market structures to a number of push and pull factors. In the literature identified points appear to be the most vital factors determining the move out of agriculture. Hence, these are useful for the empirical analysis and can be directly applied. Following this, the expectations regarding the results and the discussion will be based on the literature review and the obtained results from this analysis. Before moving on to the data and method section, a theoretical framework needs to be established that is able to provide a comprehensive and distinctive concept for the various factors at play here as well as illustrate the relationship between the different variables. Hence, this is subject of the next section and is followed by establishing the hypotheses that are tested.

3   Theoretical Framework

To set a clear guiding thread for the analysis, it is important to establish a suitable framework that explains the concept of push and pull factors. As explained in the literature review, the topic is complex and to address the determinants accordingly, a framework of decisions shaped by incentives and capabilities is explained and then used for the remainder of this thesis. There are a number of frameworks that have been developed within the field, such as the sustainable livelihood concept, which aims at analysing all the factors that compromise livelihood. This involves the natural, physical, human and financial assets, social capital, activities and the access households have to these aspects (Ellis, 2000, p. 10; Davis & Bezemer, 2004). Closely related to this, another concept, placing the focus on the so-called distress-push and demand-pull factors as determinants of the rural non-farm economy diversification, has emerged (Davis & Bezemer, 2004). This approach is meant to be more sensitive to the various possible factors impacting the process, which is useful considering the number of factors the literature review has shown to be of importance. Additionally, it offers a clear distinction between the factors, simplifying disentangling the complex relationships. Another advantage stems from the fact that it is able to account for differing rural development processes and it has been acknowledged as a useful instrument to analyse the economic significance of the rural non-farm economy (Davis & Bezemer, 2004). Following this, the theory explaining the decision to diversify income for this thesis is based on the original framework by Ellis (2000, p. 72) and the slight variations of the framework used by other authors, such as Davis & Bezemer (2004) and Reardon et al. (2007). The theory can be seen as a part or one aspect of the sustainable livelihood concept and is directly derived from it. As a result, the framework of distress-push and demand-pull is the chosen framework for this estimation and is further explained below:

The first part concerns the possible choices to diversify, where the decision to leave agriculture can be modelled according to economic factor supply models. The function of labour supply is determined by a set of incentive and capacity variables (Reardon et al., 2007). In this setting, the household is expected to want to maximise its income. However, this decision is restricted by the limited availability of resources and the need to balance out profit maximisation and risk minimisation. The diversification into off-farm employment can then be divided into five subcategories, which illustrate interlinked and simultaneous choices: First, it is about the basic decision between employment in the farm and non-farm sector. The second point describes the level to which this activity can be characterised as a non-farm occupation. Third, the activity can take place in different sectors, such as manufacturing or services. Fourth, there exists a difference between undertaking this activity in the local area or migrate towards, for instance, urban centres. The last point distinguishes between the form of employment, namely self- or wage-employment (Reardon et al., 2007).

This decision-making process is shaped by incentives, the push and pull factors. As part of this framework, the terms have also been coined as demand-pull and distress-push (Davis & Bezemer, 2004). On the one hand, the change that is based on distress-push aspects is shaped in an environment of agricultural un- or underemployment, high risk, income fluctuations and market inadequacies, where the decision is usually caused by economic difficulties. Rather than increasing income, this set of factors leads to undertaking activities with lower productivity than agricultural production to avoid further income declines or fluctuations. The main point here is that the stimulus for rural areas to grow and transform is missing, leading to an unsustainable change of the rural society with vulnerable work opportunities (Berdegué, Rosada & Bebbington, 2014). This process can include a number of factors, for instance, high transaction costs, the seasonality of agricultural output and revenue as well as constraints imposed by shocks or financial assets. Income diversification due to demand-pull factors, on the other hand, is motivated by new opportunities, for instance, due to the advancing market and technological structures. Within this path of the framework, increasing labour productivity and incomes can be observed in many cases.

The framework of demand-pull and distress-push is able to capture a number of possible rural non-farm developments. This is vital since it might be the case that not only one of the sides or factors prevails, as shown in the literature review. Rather, the move out of agriculture might be jointly impacted by both sides. Thereby, the diversification would create a scenario where both, high- and low-income groups, are engaging in high- and low-return activities. Another meaningful part included in the framework concerns the impact of capacity variables, such as financial, human, social, natural and physical capital. This is important since the literature review suggests that these aspects can significantly impact the ability to pursue new employment opportunities. For example, in a case where mainly distress-push (demand-pull) factors are at play, it can be anticipated that households with lower incomes (higher incomes) are more likely to engage in rural non-farm occupations. As shown before, poorer household, for instance, tend to lack access to opportunities and are more affected by seasonal shocks, among other factors. Thus, it can be assumed that the capacity and incentive variables are closely related and shape each other, possibly making the relationship challenging to disentangle.

Taken together, the push and pull factors shape the incentives to move out of agriculture with capacity variables being closely related to this and affecting both, the decision itself but also the opportunities faced by the individual. The focus on this relationship stems from the research question but also from the literature review, which has illustrated that the complex nature of the relationship between variables needs a simple framework. Offering a simple and useful overview of how the variables affect each other and the decision process is the main reason the theory is employed. It offers useful guidelines for the interpretation and discussion of the push, pull and capacity variables. Hence, it is used to group the variables into three different categories and to be able to illustrate which set of factors matters for this sample. Presenting the chosen framework illustrates that income diversification does not per se promote rural development and economic transformation. Depending on the factors behind

the move out agriculture the strategy can either be a way out of poverty or a plan to survive. Following this, the theoretical framework is used as a concept to gain new insights into the relationship for Uganda and Ethiopia and is applied to the empirical analysis. The concept is utilised by categorising the variables according to incentives, as in push and pull variables, and the attempt to control for some capability characteristics. Furthermore, this will be taken into account for the analysis and discussion to be able to offer comprehensive insights into the relationship.

Grounded in the reviewed literature and the theoretical framework, the following hypotheses can be derived and are tested in this thesis:

Hypothesis 1: The determinants of non-farm activity diversification in Uganda and Ethiopia depend on a combination of push and pull factors as well as capacity variables.

The literature review has shown a tendency that in many cases, also for earlier studies conducted in the two countries, both sets of factors matter for the decision to move out of agriculture. Furthermore, capability factors, which shape the incentive structure for diversification, appears to be of significance.

Hypothesis 2: Depending on the labour activity and the location, the factors determining why individuals move out of agriculture differ from each other.

Similarly to the first hypothesis, this is based on the literature review and the theoretical framework, which have illustrated that the relationship highly depends on the occupation and the local context.

4 Data

4.1 Sample and Variables

The data has been collected using the National Household Survey (NHS) from 2015/2016 for Uganda and the Socioeconomic Survey for Ethiopia (ESS) in the same years through a two-stage probability sampling. The surveys are carried out over a 12-month period and two visits to account for the seasonality of agricultural outputs, consumption and expenditure patterns and include questionnaires about agriculture, household, community and woman questionnaire. The data is designed to embody a nationally representative sample and includes around 3305 households in Uganda (UBOS, 2017) and 4954 households in Ethiopia (CSA, 2017). Besides the advantage of being collected at the same time, the surveys have also been carried out under the same World Bank Development Data programme, the LSMS-ISA. The data itself has been collected by the national statistics offices, the Uganda Bureau of Statistics (UBOS) and the Central Statistical Agency (CSA) of Ethiopia. The collaboration was established to produce a set of panel data in rural and urban areas on a number of household and community characteristics linked to agriculture. The partnership, moreover, ensures that the technical design, analytical work and the management of the data is of the same high quality. For instance, the questionnaires were checked for data entry errors and eliminated through additional rounds of interviews. After that additional cleaning and checks were undertaken to provide the necessary quality (CSA, 2017). The set, as a result, not only offers the chance to explore the relationship in one country but also the opportunity to compare the results due to the similar structure. Furthermore, the two surveys were only published recently. As a result, they can offer new insights into the decision-making process of participating in non-farm employment, thereby updating earlier findings.

To be able to run the analysis proposed in the next section, the data for Uganda and Ethiopia needed to be coded and adjusted. Following this, only individuals that are between the age of 15 and 65 who live in rural areas are used for the non-farm employment decision. Excluded were also people still in school and for the regression analysis, people with multiple occupations are dropped from the sample as well. Furthermore, employment data was not available for all individuals which overall leads to a reduced sample of 2770 observations for Ethiopia and 3027 for Uganda. For the main dependent variable, i.e. type of employment, individuals were grouped into either working in agriculture, fishing or hunting in non-farm wage employment or in non-farm self-employment. This was based on the question about whether or not an individual is in the workforce and the question on the main activity/job. Due to the number of different occupations one challenge was to group every individual into

the correct group. For example, job descriptions for the Ethiopian sample are only available in the local language Amharic and the explanations for both samples were not always consistent. As a result, the survey data was scanned carefully to avoid sorting individuals into the wrong class. The division between farm and non-farm employment follows the difference between sectors rather than function and is based on the reviewed literature (see for instance Bezu, Barrett & Holden, 2014; Schmidt & Bekele, 2016). Agricultural activities are defined as the production of unprocessed crops, livestock, fish or forest-related products based on natural resources. This not only includes self-employment in the form of an owned farm but also wage employment. Non-farm activities, in contrast, include all forms of income-generating jobs that are not involved in the primary production of agricultural goods. This comprises of a wide range of occupations from mining, construction, transport but also government services such as working in the healthcare and education sector. Furthermore, agro-processing and transport of agricultural commodities are grouped into this field. The classes are divided into self-employment and wage employment, creating three possible outcomes including the base class agricultural activities. The division was based on the direct question of the form of employment in the Ugandan survey while for Ethiopia the filter of enterprises operating over any point in the last 12 months and are still active is used.

The independent variables used in the analysis include a number of factors ranging from personal characteristics, such as age and gender, to labour market time allocation factors, available push and pull factors and capacity variables, such as non-financial assets and the level of education. These were chosen based on the factors identified in the literature review as important determinants. Using the individual identifiers, the regressions are carried out on the disaggregated individual level for both countries, however, some of the variables are only available on the household- and community-level and are assigned accordingly. All the variables were derived from the findings in the literature review and a detailed explanation of the data used is available in Table 1, providing an overview of how variables were constructed. The selection is based on the determining factors identified in the literature review and the availability of fitting measures. What needs to be noted here is that the Asset Value variable was not available for Uganda. Instead, a variable presenting the level of consumption expenditure is used in this case to be able to control for the initial financial capabilities of households. Similarly, the variable illustrating whether or not the individual has a bank account is only obtainable for Ethiopia, making it necessary to exclude this factor from the Ugandan analysis.

Table 1: Variables included in the Empirical Analysis

	(1)	(2)	(3)
Variable	Description	Type	Expected Effect
Age	How old is the individual in years	Continuous	Undetermined
Sex	Variable indicating gender of the individual (female=1; male=0)	Dichotomous	Negative
Adults in Household	Number of people living in household between the age of 15 and 65 (adult members)	Ordinal	Positive
Education	Dummy variables for Some School, Junior High School, Finished High School and Degree above High School	Dichotomous	Positive
Livestock Holdings	Number of Livestock owned by the household	Continuous	Negative
Land Holdings	Size of agricultural land owned by the household in acres	Continuous	Undetermined
Asset Value	Estimated value of non-financial assets owned by the household	Continuous	Positive
Consumption Expenditure	Total annual non-food Consumption Expenditure	Continuous	Positive
Electricity	Whether or not household has (permanent) electricity in the house (yes=1; no=0)	Dichotomous	Positive
Shock	Has experienced agricultural (such as floods, droughts or erosion) shock within the last 12 months (yes=1; no=0)	Dichotomous	Negative
Population Density	Number of people in the district per km^2	Continuous	Negative
Agroecology	Estimation of soil quality (good=1; fair/bad=0)	Dummy	Positive
Distance Road	Distance from the community to the closest all-weather road	Continuous	Negative
Distance Market	Distance from the community to the next market	Continuous	Negative
Bank Account	Whether or not an individual has an account at a formal financial institution (yes=1; no=0)	Dichotomous	Positive

Table 2: Variables according to Push, Pull and Capacity Factors

Distress-Push Factors	Demand-Pull Factors	Capacity Factors
Agricultural Shock	Distance to paved road	Asset Value/Consumption Expenditure
Population Density	Distance to market	Electricity
Agroecology	Adults in the Household	Livestock Holdings
Bank Account		Education
Availability of Land (Land Holdings)		

To connect the classification of factors established in the literature review and theory, it is important to categorise the presented variables within this framework. The division between demand-pull, distress-push and capability variables is presented in Table 2 to provide an overview and use it as the basis for the empirical analysis. The table only includes factors that can be directly grouped, which explains why demographic factors, such as age or gender, are not included here. Although this is the case, the factors are used in the study since they have been proven to be of importance here (Bezu, Barrett & Holden, 2014). Moreover, it needs to be noted that the division can depend on the construction of variables and this table should not necessarily be understood as a general classification. For example, the variable representing land holdings could be acknowledged as a proxy for initial wealth and be categorised as a capacity factor. Yet, in a number of studies the lack of available land is seen as a push factor forcing people to leave agriculture (see for example Matsumoto, Kijima & Yamano, 2006 or Bezu, Barrett & Holden, 2014). Accordingly, this approach is adopted here. Another factor that can be seen in Table 2 is that the estimation mainly uses distress-push and capability/capacity variables for the estimation. This can be explained by the difficulty of measuring pull variables, such as labour demand and the differences in wage rates. Following this, it can be stated that the survey offers a unique and detailed set of the labour market and personal information on individuals living in rural Ethiopia and Uganda. Nevertheless, the data also comes with certain shortcomings that need to be considered and are discussed further in the next sub-section.

4.2   Data Limitations

Certain limitations that arise with using the household surveys for Ethiopia and Uganda (CSA, 2017; UBOS, 2017) result from the slight differences in what and how questions were asked. For instance, the lack of published information on financially related topics for Uganda can be criticised. Other surveys, such as the Financial Inclusion dataset, have been explored in an attempt to close this gap, however, the data cannot be matched on the individual- or household-level due to different samples and identification particulars. As a result, information on whether or not the individual has an account at a financial institution can only be included for Ethiopia. Similarly, the value of non-financial assets in the household is not part of the officially published data for Ethiopia, making it necessary to replace the variable with a measure on the consumption expenditure. This could impact the comparative aspect of the study. Similarly, the measures for the distance to a paved road and markets for Uganda is characterised by a substantial number of missing values. Since the method can only be used when no missing values are present, neighbouring district and households were used to fill in the gaps. This proved to be one of the greatest challenges and limitations of the study. Although this was done with great care, it cannot be guaranteed that the measures fully reflect the situation in the districts and households. Another identified issue is that many measures rely on self-reported values. For instance, the value of assets for the Ugandan survey might not display the correct market prices and could be over- or underestimated, thereby affecting the reliability. However, due to the scarcity of alternative data, this is assumed to the best available measure for it.

Overall, the limitations should be taken into account when analysing the results as it is possible for them to affect the regression analysis negatively, particularly aspects related to reliability and comparability. Therefore, the limitations are further considered in the discussion of the results. Nevertheless, the datasets remain useful as they offer unique and fairly detailed insights into the rural labour markets of Ethiopia and Uganda. Based on this, the next section fits a model that can account for the characteristics of the survey data with categorical outcomes, so as to make the best use of the available data.

5   Method

The nature of the data, as well as the research question and hypotheses, make it necessary to use a quantitative approach. Based on this, the empirical section is composed of an estimation method that fits the available data and is in line with the established literature examining the determinants of the rural economy towards non-farm employment.

The calculations begin with the characteristics of the rural non-farm economy of Uganda and Ethiopia in the form of descriptive statistics to provide a basic overview. Thereafter, the main point of the analysis will use a Multinomial Logit model to study the individual, household and communal determinants of the move out of agriculture. The aim is to determine whether the changes are caused by demand-pull, distress-push or capability variables, opening the possibility to determine the driving factors of the economic diversification process. The model choice is grounded in the nature of the datasets which are characterised by multiple categorical outcome variables, i.e. farm employment, non-farm wage and self-employment. This allows the calculation of the probability to engage in the non-farm employment opportunities based on a number of individual, household and community characteristics.

To be able to tell whether the model is the right choice and identified correctly a closer look at the requirements is necessary: The advantages of the model for this analysis are clear since it does not assume linearity, homoscedasticity or normality. These are possible factors that could be violated in the case of household survey data if this was not the case. Furthermore, it allows for small sample sizes in the categories with the recommended minimum being 10 (Schwab, 2002). This is useful for this estimation considering that some categories, such as self-employment in Ethiopia, only contain around 50 observations. As a result, the sample size restriction is fulfilled for all specifications. One aspect that violates the assumptions is multicollinearity between the independent variables with perfect multicollinearity making the estimation impossible and strong correlation leads to imprecise results. Hence, the analysis will start off with an evaluation of the correlation between the variables to strengthen the results. The estimation strategy for the MNL is based on the underlying theory of random utility maximisation theory of the individual's choice and is defined as (Cameron & Trivedi, 2005, p. 500):

(1) $$P_{ij} = \frac{e^{X'_i \beta_j}}{\sum_{l=1}^{m} e^{X'_i \beta_{l'}}} = F_j(X_i, \beta)$$

with j = 0,1,2..., m; i= 1,2,3,..., n and the restriction of $\beta_1 = 0$ is needed because of $\sum_{j=1}^{m} p_{ij} = 1$. X_i represents a vector of explanatory variables β_j is the vector of coefficients associated with that. Y_i is the choice of the individual whether to be employed in the farm, non-farm

wage or non-farm self-employment sector. Finally, F_j is the cumulative density function with an error term which is assumed to follow the logistic distribution. In estimating a multinomial logit model, the coefficient vector and heterogeneity term of the base category has to be set to zero to be able to identify the model. As mentioned before, farm employment is used as the base category and will be compared to the two other outcome categories. The calculations are estimated by using robust standard errors.

While the method is widely used in the field's literature, it is characterised by certain limitations. One possible issue stems from the assumption of the independence of irrelevant alternatives (IIA). Violating this assumption would mean the model would not perform well and an alternative would need to be employed (Cameron & Trivedi, p. 503). To test this, a suest-based Hausman test of the IIA assumption is calculated. Since the test fails to reject the null hypothesis, it can be assumed that the assumption is not violated and the estimation can be continued. Furthermore, the coefficients, particularly the magnitude, in this model are difficult to interpret. Different options ranging from odds ratios to marginal effects are available for a simple interpretation of the results. For this analysis, the decision has been made to present and focus on the "marginal effects on the choice probabilities of a change in the regressor for a given individual" (Cameron & Trivedi, 2005, p. 501). In other words, the marginal effects present the results as differences in probabilities. This is widely done in the existing literature and enables a simple interpretation by using the sign and the size of the coefficient. Additionally, marginal effects can be more informative compared to odds ratios. As a result, both limitations are addressed to some extent in the following estimations and should not impact the results.

6   Results

6.1   Descriptive Statistics

Table 3: Summary Statistics for Uganda

Variables	(1) Obs	(2) Mean	(3) Std.Dev.	(4) Min	(5) Max
Shock	3027	.251	.434	0	1
Some Schooling	3027	.408	.491	0	1
Junior High School	3027	.131	.338	0	1
High School	3027	.124	.33	0	1
Above High School	3027	.034	.181	0	1
Sex	3027	.563	.496	0	1
Age	3027	31.316	14.257	15	65
Asset Value	3027	6030000	1.81e+07	0	4.10e+08
Land Holdings	3027	3.142	8.674	0	300
Electricity	3027	.025	.155	0	1
Adults in Household	3027	3.713	1.892	1	13
Livestock	3027	12.251	19.125	0	222
Population Density	3027	264.278	164.321	23	1060
Soil Quality	3027	.642	.48	0	1
Road Distance	3027	50.036	44.979	0	104
Market Distance	3027	4.731	5.067	0	40

Studying the summary statistics, displayed in Table 3 and 4, reveals that the mean value for suffering from an agricultural shock was twice as high for the sample in Ethiopia in 2015. Similarly, some differences can be detected between the countries when it comes to the level of education with Uganda's sample reflecting a mean that is three times as high as the one

displayed for Ethiopia in Table 4. The differences in the sample continue and show that substantially more female and younger labour force participants remain on average in the sample of Uganda compared to Ethiopia. The tables, furthermore, illustrate that the mean of the sample of the adult members in a household is larger in Uganda. Interestingly, the mean for distance to market is substantially larger tin Ethiopia than in Uganda while the opposite is true for the distance to a paved road. Other measures show similar differences, illustrating that the samples as depicted here differ from each other. This could possibly indicate that the determining factors across Uganda and Ethiopia differ, however, this needs to be examined further. At the same time, some similarities can be detected: Both countries show high standard deviations for the wealth variables, Consumption Expenditure and Asset Value as well as for Population Density, indicating a varying structure within the countries already. Therefore, the first exploration suggests significant differences between and within the two countries for the variables in the sample.

Table 4: Summary Statistics for Ethiopia

Variable	Obs	Mean	Std.Dev.	Min	Max
Shock	2770	.516	.5	0	1
Some Schooling	2770	.271	.445	0	1
Junior High School	2770	.151	.358	0	1
High School	2770	.045	.207	0	1
Above High School	2770	.044	.206	0	1
Sex	2770	.247	.432	0	1
Age	2770	41.514	11.973	15	65
Consumption Expenditure	2770	4444.265	4237.46	0	40108
Land Holdings	2770	3.805	20.571	0	1054.558
Electricity	2770	.344	.475	0	1
Adults in Household	2770	2.939	1.403	0	10
Livestock	2770	12.342	14.386	0	233
Population Density	2770	365.469	1319.255	25	25000
Soil Quality	2770	1.396	.651	1	7
Road Distance	2770	15.264	18.592	0	271
Market Distance	2770	65.729	49.136	1	283
Bank Account	2770	.209	.407	0	1

When considering the share of people being active in the non-farm economy, Figure 1 confirms the idea from the earlier sections that the majority of individuals remains employed

in agricultural activities with more than 90% of individuals in the sample being employed in the agrarian sector. However, the numbers depicted here should not be taken as a literal representation of the whole economic situation in rural Uganda and Ethiopia. It can be assumed that the share of non-farm employed individuals in this sample is lower than the overall reported numbers for participation in non-farm activities due to issues related to the data. A substantial number of non-farm participants had to be dropped from the sample because of missing data and the requirements, such as being located in rural areas. As a result, it should be kept in mind that this is a representation of the sample dynamics rather than the complete dynamics in the country.
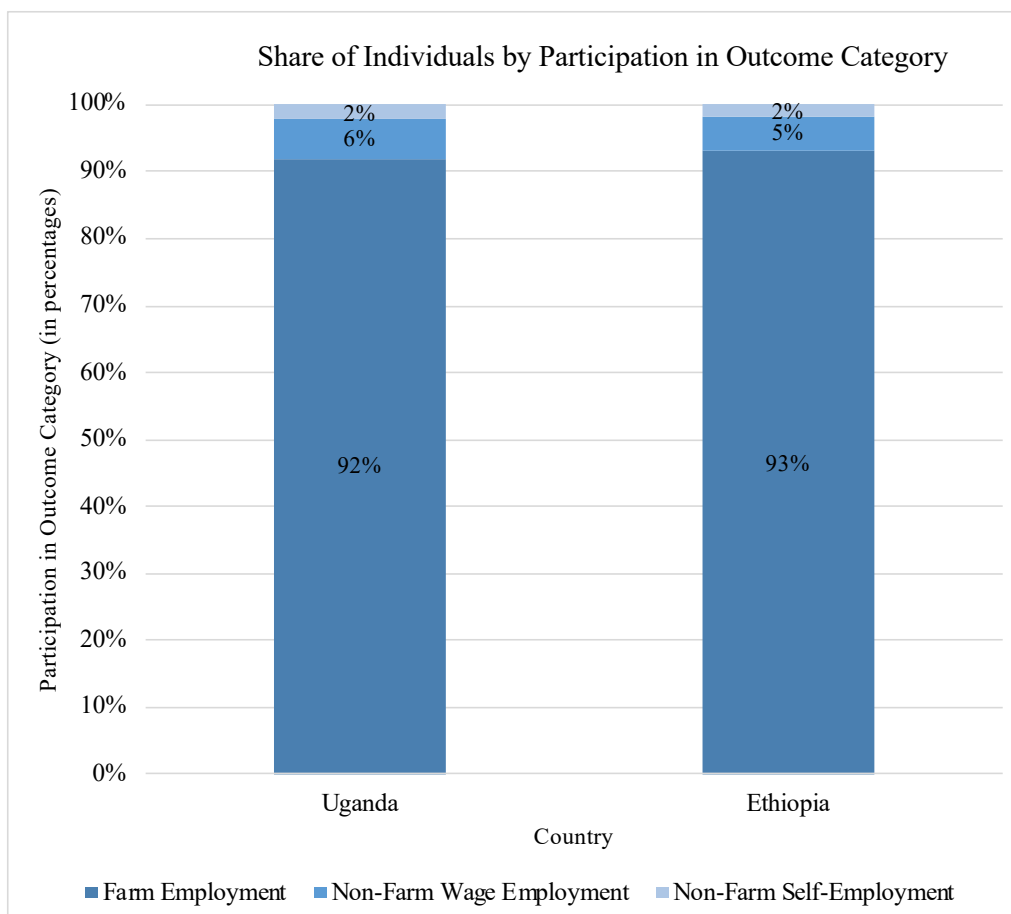
Figure 1: Share of Individuals in Different Sectors; own calculation based on CSA (2017) and UBOS (2017)

Moreover, further information is available for Ethiopia on the constraints and opportunities faced by individuals in the rural labour market. This is displayed in Figure 2 and 3 in Appendix A. In Figure 2, where individuals were asked about the development of the non-farm economy over the past two years (CSA, 2017), the findings are mixed. 36% of individuals answered that the situation is better now, while at the same time the other 64% of individuals see no changes or even say the situation has gotten worse. When looking more closely at the reasons why people might feel negatively about employment opportunities in

the non-farm sector, Figure 3 shows that people see constraints particularly in issues related to market access, information and market demand. Here individuals were asked the question of why they are not considering opening up a non-farm enterprise (CSA, 2017). Since these questions were not officially documented for Uganda, the data can neither be obtained for this sample nor compared to Ethiopia. However, taking the results of the empirical estimation of the Multinomial Logit model into account, the results of the questions might give further insights into the dynamics in the rural economy and can be used for the analysis and discussion section. This is the reason why the statistics are displayed in Appendix A.

6.2   Multinomial Logit Model

An essential part of the estimation of a MNL is to control for possible multicollinearity since it can violate the model assumptions or make the calculations impossible. To be able to reject this for the two datasets employed here, the pairwise correlation matrices for all the variables used in the regressions are calculated. Both tables are available in Appendix B. Table 7 for Uganda shows that none of the variables are highly correlated since less than 0.5 of the variables can be explained by another variable. Mostly, the variables show a correlation smaller than 0.1 with the exceptions of some cases. For example, the schooling variables are characterised by a higher level, of around 0.31-0.32 which can be expected from how the variables were constructed. Similarly, proxies related to the wealth of households, such as asset value and electricity, are somewhat higher correlated with values around 0.21-0.23. A similar conclusion can be drawn from Table 8, which depicts the case of Ethiopia. To be sure that multicollinearity will not impose limitations onto the estimation, the variance inflation factor test is conducted for both sets of variables, indicating how much of the variance is inflated for each coefficient. The results for both countries are displayed in Table 9 in Appendix B. A value of 1 indicates that the variables are not correlated and a higher number indicates increasing correlation. Table 9 shows that multicollinearity should not be an issue in this setting since none of the factors are defined by values significantly higher than 1. As a result, the estimation with the multinomial logit model can continue.

The Tables 5 and 6 below present the marginal effects of the estimated multinomial logit model. The marginal effects are displayed for the results since the coefficients in the MNL are estimated in relation to the base category and are challenging to interpret. The marginal effects are useful to draw conclusions directly and are therefore focused on here. Due to one of the main objectives of this thesis to deliver a comparative estimation, the results are presented for Uganda and Ethiopia at the same time and are structured according to the group of variables. The findings for the three outcome variables for Uganda are shown in Table 5 with farm employment as the base category. The shock variable is negative for the move into either of the non-farm categories. In accordance with that, Table 6, which shows the estimates for Ethiopia, illustrates the mixed relationship. This indicates that people who have experienced a shock related to agricultural production are less likely to be engaged in non-

farm activities. While this is an unexpected result, two reasons could possibly explain the findings: First, individuals, who are employed in farm activities, are more likely to be affected by these shocks and report them. Second, to mitigate the effect of shocks, individuals might diversify their income structure by holding multiples jobs or by a temporary transition only, which would not be captured here. However, it needs to be noted that the coefficients are not statistically significant at any of the specified levels, thereby, assigning more meaning to other determinants.

Table 5: Multinomial Logit Estimations for Uganda

	(1)	(2)	(3)
Variables	Farm Employment	Non-Farm Wage Employment	Non-Farm Self-Employment
Shock	0.0260	-0.0152	-0.0108
	(0.0129)**	(0.0110)	(0.0075)
Some Schooling	-0.0418	0.0304	0.0114
	(0.0154)***	(0.0140)**	(0.0086)
Junior High School	-0.0735	0.0649	0.0086
	(0.0184)***	(0.0164)***	(0.0107)
High School	-0.1006	0.0797	0.0208
	(0.0160)***	(0.0143)***	(0.0094)**
Above High School	-0.1896	0.1571	0.0325
	(0.0200)***	(0.0172)***	(0.0115)***
Sex	0.1037	-0.0814	-0.0223
	(0.0110)***	(0.0102)***	(0.0062)***
Age	-0.0000	-0.0007	0.0007
	(0.0004)	(0.0003)**	(0.0002)***
Asset Value	-0.0000	0.0000	0.0000
	(0.0000)**	(0.0000)	(0.0000)*
Land Holdings	0.0044	0.0005	-0.0049
	(0.0020)**	(0.0011)	(0.0018)***
Electricity	-0.0357	0.0155	0.0202
	(0.0188)*	(0.0151)	(0.0131)
Adult in Household	0.0030	0.0025	-0.0055
	(0.0027)	(0.0021)	(0.0019)***
Livestock	0.0015	-0.0017	0.0001
	(0.0005)***	(0.0005)***	(0.0001)
Population Density	-0.0000	0.0000	-0.0000
	(0.0000)	(0.0000)**	(0.0000)*
Soil Quality	0.0350	-0.0283	-0.0067
	(0.0096)***	(0.0083)***	(0.0057)
Road Distance	0.0004	-0.0004	0.0000
	(0.0001)***	(0.0001)***	(0.0001)
Market Distance	-0.0025	0.0019	0.0006
	(0.0007)***	(0.0006)***	(0.0004)
N	3,027	3,027	3,027

Robust standard errors in parentheses
* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Another factor related to agroecology is the dummy variable for soil quality. The coefficient for Uganda, illustrated in Table 5, reflects that people benefitting from good soil quality are less likely to participate in non-farm activities. This could be seen as unexpected because non-farm activities are higher in areas with better agroecology. However, this could be caused by a positive effect on non-farm income rather than being reflected in a move out of agriculture (Bezu, Barrett & Holden, 2014). The coefficients are only significant for two of the Ugandan categories, whereas the estimations in Table 6 show no significant relationship for the Ethiopian case.

The education variables Some Schooling, Junior High School, High School and Above High School are all positive and significant at least on the 95% confidence level for being active in non-farm wage employment. Similarly, the values for self-employment show the same pattern, however, only for the latter two education-related coefficients. In Ethiopia (see Table 6) the relationship between the sector of employment and human capital appears similar. The main difference here lies in the fact that mainly higher level of education, namely High School and above, are statistically significant. Individuals are more likely to be employed in non-farm activities with that educational status for this sample. This strongly suggests that, for both countries, people with a higher level of education tend to opt for employment outside of the farm sector and is further confirmed by the negative relationship for farm employment and higher levels of education. This could, furthermore, indicate that the requirements for employment in wage or self-employment activities as well as between Ethiopia and Uganda differ.

Further factors with significant coefficients are the demographic related variables Sex, Adults in Household, Population Density and Age. The estimates reflect that women are less likely to be in non-farm employment in Uganda, which is significant at the highest confidence level. Furthermore, the marginal effect of 0.1037 for farm employment is relatively large and shows that women are considerably more likely to work in this sector. Interestingly, Ethiopia displays the opposite relationship with women being significantly more likely to be employed in non-farm activities. The relationship for Age and Adults in Household is less clear since the signs differ between the outcome categories. While the estimates are statistically significant, the magnitude is rather small with a value of 0.0007 for the non-farm categories, indicating no clear linkage between the factors. Similarly, the only significant estimate for Adults in Household is the negative coefficient of -0.0055 for being an entrepreneur outside of agriculture. For Ethiopia, the estimates in Table 6 show that older individuals are less likely to be employed in activities outside of agriculture. The coefficients are small with ranging from -0.0006 for self-employment to -0.0028 for wage employment but are significant at the 0.01 level. In accordance with that, the farm employment estimate confirms this by yielding a positive and significant coefficient. The relationship for Adults in Household in the Ethiopian case is positive for the non-farm categories, showing that a higher number of adults in the household increases the likelihood to be employed outside of agriculture. The results suggest they are pulled out of agriculture. Generally, this indicates differing results for variables related to demographic characteristics and shows that the correlations are mixed depending on the country case.

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Table 6: Multinomial Logit Estimations for Ethiopia

Variables	(1) Farm Employment	(2) Non-Farm Wage Employment	(3) Non-Farm Self-Employment
Shock	0.0066	-0.0069	0.0003
	(0.0075)	(0.0071)	(0.0047)
Some Schooling	0.0015	0.0073	-0.0088
	(0.0090)	(0.0085)	(0.0076)
Junior High School	0.0129	-0.0197	0.0068
	(0.0103)	(0.0102)*	(0.0064)
High School	-0.0310	0.0203	0.0106
	(0.0127)**	(0.0115)*	(0.0083)
Above High School	-0.0928	0.0681	0.0247
	(0.0092)***	(0.0087)***	(0.0058)***
Sex	-0.0457	0.0327	0.0130
	(0.0084)***	(0.0078)***	(0.0055)**
Age	0.0034	-0.0028	-0.0006
	(0.0004)***	(0.0004)***	(0.0002)***
Consumption Expenditure	0.0000	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)
Land Holdings	0.0089	-0.0073	-0.0016
	(0.0020)***	(0.0019)***	(0.0014)
Electricity	-0.0204	0.0060	0.0144
	(0.0090)**	(0.0086)	(0.0061)**
Adults in Household	-0.0138	0.0085	0.0053
	(0.0024)***	(0.0022)***	(0.0014)***
Livestock	-0.0006	0.0008	-0.0003
	(0.0003)**	(0.0002)***	(0.0003)
Population Density	-0.0000	0.0000	0.0000
	(0.0000)***	(0.0000)***	(0.0000)
Soil Quality	0.0117	-0.006	-0.0010
	(0.0078)	(0.0074)	(0.0052)
Road Distance	-0.0004	0.0004	-0.0000
	(0.0002)	(0.0002)**	(0.0001)
Market Distance	-0.0000	-0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)
Bank Account	-0.0556	0.0362	0.0194
	(0.0085)***	(0.0081)***	(0.0065)***
N	2,770	2,770	2,770

Robust standard errors in parentheses

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

A similar result can be obtained for Asset Value since the coefficient is estimated to be close to 0. This relationship is also true for the consumption expenditure variable used for the Ethiopian case. This could be related to the reliability of the data, as mentioned in section

four. Other wealth and push factors, such as Livestock and Land Holdings, at the same time, show that people with higher values are less likely to engage in non-farm activities. This could indicate that the lack of available land pushes people out of agriculture and into non-farm wage employment, a relationship where the coefficient is of a small magnitude but significant at the 0.01 level and negative. One factor that could only be included for the case of Ethiopia is, furthermore, the access to a bank account at a formal institution. The coefficient is significant at the 0.01 level for all outcome categories, suggesting that individuals with a bank account are more likely to be employed in wage and self-employment outside of agriculture. This corroborates the existing literature and illustrates the importance of access to formal financial assets.

The availability of infrastructure for the Ugandan sample in Table 5 offers mixed results. Households with access to electricity are more likely to engage in non-farm activities, however, the coefficient suffers from a small magnitude and large standard errors, making it insignificant. The relationship is confirmed by the estimations for Ethiopia in Table 6 where the access to electricity increases the likelihood to be employed in non-farm activities. However, only the coefficient for self-employment is significant at the 0.05 level, indicating that the relationship depends on the type of activity. The distance to a paved road measure offers the expected negative sign for the non-farm wage employment and is significant at the 0.01 level. This indicated that access to infrastructure can play a vital role. By contrast, the distance to a market is positively related to the category. This is likely related to the aforementioned issues linked to constructing the variables. Similar observations can be obtained from the Ethiopian estimations in Table 6. The Distance to Markets variable remains inconclusive due to insignificance and the change of the sign from negative to positive from non-farm wage employment to self-employment for both cases. Distance to a paved road follows these findings since neither the sign of the coefficient nor the magnitude can provide conclusive evidence. This is an unexpected finding and could be due to several reasons. This is further examined in the discussion section to be able to explore possible reasons behind that.

It can be concluded that for Uganda and Ethiopia some determinants are important and significant for both countries, at least for certain specifications. These are, for instance, the human capital related variables, sex, age, land and livestock holdings. Despite this, in Uganda the relationship for education factors appears to be stronger since lower levels of education are significant and positive while insignificant coefficients are presented for these levels for Ethiopia. Other variables, such as gender, are suggested to be vital determinants in both countries. However, the signs differ and therefore, the variable has the opposite effect on the participation in non-farm employment. A similar conclusion can be drawn for the capacity variable depicting livestock holdings. The findings so far indicate that the determinants in the two countries mainly differ from each other. Furthermore, several different categories of determining factors, in the sense of push, pull and capacity, are of importance. These findings suggest that the hypotheses proposed in earlier sections can be accepted and that the research question can be answered by arguing that individuals move out of agriculture because of different and diverse reasons. To strengthen the results a robustness check is performed.

Following this, the results are further discussed with the expectations raised in the literature review section and the hypotheses proposed based on the literature and the theoretical framework.

6.3   Robustness Check

The literature review has shown that the relationship between determining factors and the move out of agriculture appears to be highly complex and, in many cases, dependent on local structures. To be able to take this into account to a larger extent, the robustness check introduces control variables for four regions in both countries while calculating a MNL with robust standard errors. This was constructed using the geocoded data from the household surveys and the estimates are illustrated in Table 10 and 11, for Uganda and Ethiopia respectively.

Table 10 for Uganda shows that mostly the coefficients are of the same sign and similar size as before. It can be seen that education is still one of the main determinants of non-farm employment in this sample for several levels and both forms of employment outside of agriculture. It also appears that including the regional control variables has not led to a significant change in most variables that were insignificant before. Yet, the region dummies for number three and four are statistically significant for farm employment as well as non-farm wage employment This suggests that differences across regions within a country are important for examining the determining factors for leaving agriculture since the likelihood of being employed in a certain sector differs. This is not surprising considering that the regions within a country are unlikely to be characterised by the same economic structure and development pattern. Compared to Uganda, Table 11 reflects the estimations with dummy variables for the regions in Ethiopia. Similar observations can be made here since the coefficient remain mostly comparable to the estimates in the first specification. Following the results for the Ugandan regressions, the region dummies are statistically significant. However, the relationship is more pronounced in this case since all dummies, except for the first region, and for all employment outcomes are significant. This indicates the likelihood of being employed in non-farm activities depends on the region within the countries. Given that the literature review showed a similar relationship, the robustness check offers the expected results. However, it is also vital to not overstate the observed effect here. A more in-depth analysis would be needed to reach conclusive results. To put the obtained results into perspective and try to connect it back to the research question, the next section deals with the analysis of the findings.

6.4   Analysis

The findings from the empirical analysis confirm the first hypothesis proposed in this thesis, which states that the determining factors behind the move into non-farm activities are not only shaped by one set of variables, thereby further highlighting the complexity of the subject. Indeed, push, pull and capability variables have all been suggested to impact the decision to participate in non-farm employment. For example, one significant capacity factor found to be important here is the level of education, which is valid for most specifications and both countries. Mostly, individuals with a High School diploma, and especially people with a degree above that level, can benefit from non-farm activities. However, several push factors are at play as well, indicating the importance of these variables. In Ethiopia, access to financial accounts is a vital factor, suggesting that the lack of access to credit markets might impinge on the ability of rural families to absorb shocks and as a result, might act as a push towards non-farm activities in an attempt to alleviate the effect of income shocks. However, one needs to take into account that the incidence of having a bank account is a proxy for the access to financial services in the country and further examinations of the credit market are needed for conclusive evidence. Furthermore, it would be interesting to examine to what extent the Ugandan case offers similar findings. Despite this, the relatively small share of individuals in Ethiopia having an established bank account illustrates that the financial markets might not be well established in the rural parts of the country, a result which can be seen as not surprising considering the findings in other studies presented in the literature review.

At the same time, the results have also shown that some variables remain insignificant despite the suggestions in the literature that they may be important factors in the decision to move out of agriculture. This, among others, includes the incident of agricultural shocks and, in some specifications, asset-related variables. As a result, it is important to explore the results further and discuss potential reasons for explaining these unexpected results. Closely examining the literature on the topic reveals that several cases the sign of variables differs, variables remain insignificant or of a small magnitude. An illustrating example is a study by Bezu, Barrett & Holden (2014), who find no statistically significant effect for population density and distance to the next town. Therefore, the results obtained here for some variables, such as the market access factors, may not be seen as contradictory to the literature but as reflective of a less well-established pattern. The literature appears to agree on two possible reasons, which can be explored in this context.

First, household survey data from developing countries can suffer from certain shortcomings. As mentioned previously, the values may suffer from reliability and validity issues due to false reporting, missing values or coding mistakes. For instance, it is likely that individuals are involved in multiple informal employment activities, within and outside of the farm sector, however, this is not always recorded in the dataset and is difficult to account for otherwise. Directly relating to the literature, Nagler & Naudé (2017) note issues for their

MNL analysis and were forced to drop all countries except for Ethiopia and Malawi due to this reason. This shows that issues related to statistical challenges can impose constraints on the analysis.

Second, the results on the diversification appear to be dependent on the local context and the location. This indicates the second hypothesis proposed in this thesis can be accepted, stating that the effects differ depending on the level of disaggregation. As seen in the section summarising the established literature, the studies for Ethiopia and Uganda often produce differing results, and in some cases even within each country. This could be explained by the fact that many studies in this context use data collected through fieldwork for a small local sample. Schmidt & Bekele (2016), for instance, show that a large proportion of the sample population lives around 55km away from the next market. This can be considered relatively far and they conclude it might limit people to be able to use non-farm opportunities due to their location. In this context, push factors are generally emphasised. A similar conclusion may be drawn for the sample here, in particular Ethiopia. The descriptive statistics show that individuals in the Ethiopian sample reside on average 65,7 km away from a market. This and that for the distance measures large standard deviations can be observed indicates that a significant variation within the country might hide the significance of the lack of labour demand in a village or region. This is further confirmed by the descriptive statistics relating to constraints in the self-employment sector, which are displayed in Appendix A. As explained beforehand, the most common answers were the lack of market access, demand and reliable information. While this specific data is unfortunately not available for Uganda, the summary statistics indicate a similar pattern of long distances and large variations within the country and so potentially confirm the confounding influence of a lack of access to markets on the results.

Following on from this, it appears that the decision to leave the farm sector is a complex process determined by a broad set of factors. This analysis suggests that whole country examinations might hide some of the relationships found on a more disaggregated level and call for further disaggregation of the employment outcome variable. Correspondingly, a further examination of the descriptive statistics would be likely to give valuable insights since it might be more likely to reflect the complexity of the situation. Here, the question of variations within the countries themselves can be raised. In this context, sensitivity to statistical issues as well as local variations are brought forward as possible explanations for some of the obtained results. Both arguments can be supported by evidence from earlier literature and findings in this empirical analysis. For example, the impact of some push, pull and capability factors, such as access to land and soil quality, depend on the sector, namely non-farm wage or self-employment.

Overall, the research question can be answered by agreeing with the established literature. Several factors, push, pull and capacity variables matter for the decision to be employed in the non-farm sector. It might be concluded that policy recommendations related to improved access to human capital, land ownership but also improvements in the access to markets, in particular financial markets, could be beneficial for the rural development process. This can

be derived from the results, which indicate that education is highly relevant for non-farm diversification. Similarly, secure land ownership and access to land might yield positive spillover effects for the rural economic structure.

6.5   Limitations

Despite the insightful and conclusive findings discovered in this study, the results also come with certain limitations. As mentioned in section four, these shortcomings partly stem from the available data and the quality of the obtained variables. Issues related to the reliability due to missing and self-reported values could limit the scope of this study. Similarly, the validity of certain proxies may be questioned. For instance, using consumption expenditure for Ethiopia as a proxy for wealth because the value of assets was not available may not be the optimal approach. Nevertheless, as argued in section four, the inclusion of these variables was adjudged to be appropriate for this study because capability factors are a vital part of the diversification process in rural labour markets and a proxy was available. A closely related issue is that it would have been illuminating to include factors related to social capital and more specifications that can be categorised as push factors. However, these variables are complex to measure and the limited availability of reliable estimates on a disaggregated level for the country case made their exclusion necessary. A similar concern may be raised over the comparative limitations due to the lack of available information on the development and restraints of at least certain sectors in the non-farm economy. For example, detailed bank account information is only available for the Ethiopian sample, thereby preventing a comparison of the importance of the factor in both countries. Another potential limitation results from the fact that the regressions do not present the dynamic nature of the labour allocation process in Ethiopia and Uganda. The long-run dynamics might differ from the determining factors in analyses conducted for one specific year (Bezu, Barrett & Holden, 2014).

Consequently, it can be stated that no conclusions can be drawn about the long-term or causal effects. Indeed, the obtained results are suggestive findings. Despite this, the results offer interesting insights into the determinants of non-farm employment participation for the survey years. Furthermore, some limitations were anticipated before the study was conducted. One example here is the restrictions concerning certain variables and the missing values in the household surveys. As a result, the scope and aim were carefully and specifically selected to be able to address the research question and the hypotheses. Nevertheless, the limitations should be taken into account when considering the wider implications of the study and the causality of the results.

7 Conclusion

This thesis aimed to complement and extend the existing literature concerning the extent to which push, pull and capacity factors, associated determine the decision of individuals to participate in activities outside of agriculture in rural Uganda and Ethiopia. The objective of this approach was to provide empirical evidence for the significance of these factors, whilst adequately accounting for the complexity of the rural labour markets. This complexity is underlined by the presentation of a study comparing two country cases, namely Uganda and Ethiopia, which has highlighted how specific local factors impact the results.

The topic was explored through the use of recently available cross-sectional household survey data, the LSMS-ISA data more specifically, for the years 2015/16, and a Multinomial Logit model, which helped to shed light on the determining factors. The findings indicate that the determining factors differ between and within the two countries to some extent. For example, it is shown here that women are more likely to participate in non-farm employment in Ethiopia while the opposite is true for Uganda. This has led to the suggestive conclusion that a mix of push, pull and capacity variables as well as demographic factors impact the decision of individuals in the sample. The results of this study, therefore, suggest that areas deserving of particular attention include the level of education, land and livestock holdings, access to financial accounts, age and gender as well as more locally specific factors, such as access to markets and market-related information. Overall, the findings suggest a confirmation of earlier findings. Furthermore, issues related to the data construction and the fact that local differences might lead to contradictory effects and insignificant variables were discussed.

In many ways, these results highlight the importance of research approaches which are centred on the rural sectors of the economy, especially in developing economies such as Uganda and Ethiopia with large rural populations. Given that there exist certain limitations caused by the availability within this study and the evidence remains suggestive, these results underscore the need for future research into the field. This should explicitly aim at capturing the complexity of the multitude of factors to allow for a more comprehensive empirical analysis of their magnitude.

Future research can be helpful to extend the findings by approaching the topic from a more disaggregated perspective and by exploring the long-term development. For instance, the income and return structure should be taken into account since the literature suggests that this would help to distinguish between push and pull factors but also enable researchers to obtain further results on the role of capacity variables. Related to this suggestion it would, furthermore, be interesting to look more closely into whether employment outside of agriculture is mainly characterised by high- or low-return activities. This could provide

further insights into the structural change within the countries and the determining factors. Similarly, using a longer timeframe by exploring the available panel data would be a useful point. This could contribute to the findings in this field by supporting our understanding of the push, pull and capacity variables that matter for non-farm employment.

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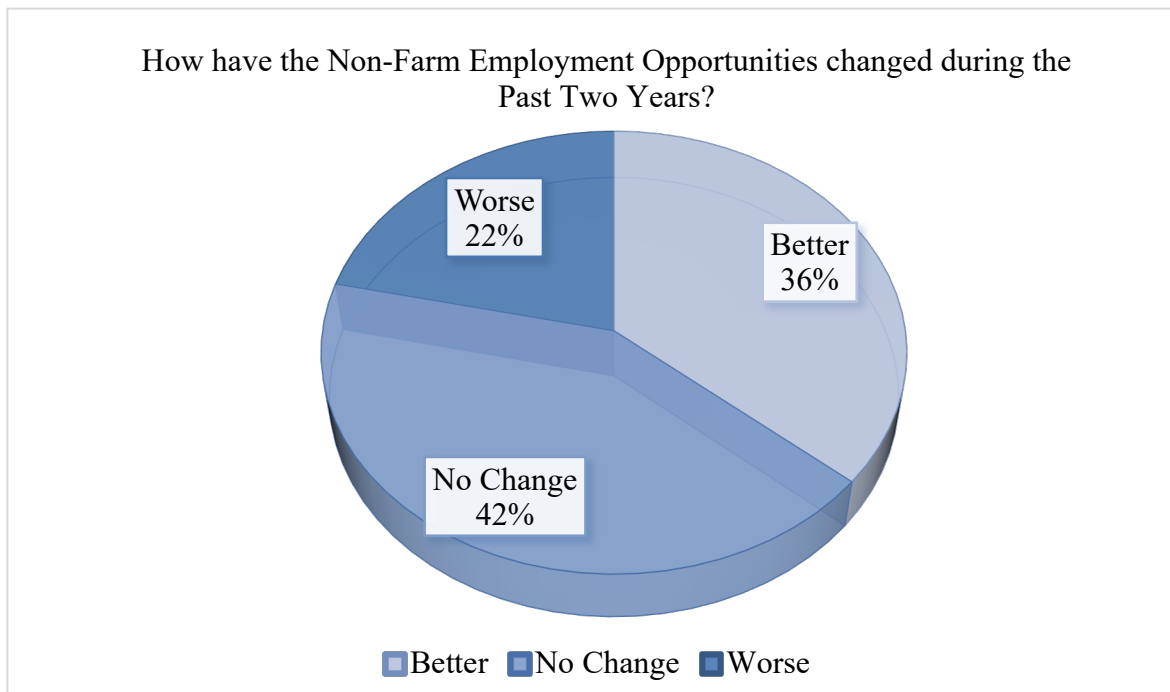
Appendix A

Figure 2: Opinion on Development of Non-Farm Sectors in Ethiopia; own calculation based on CSA (2017)
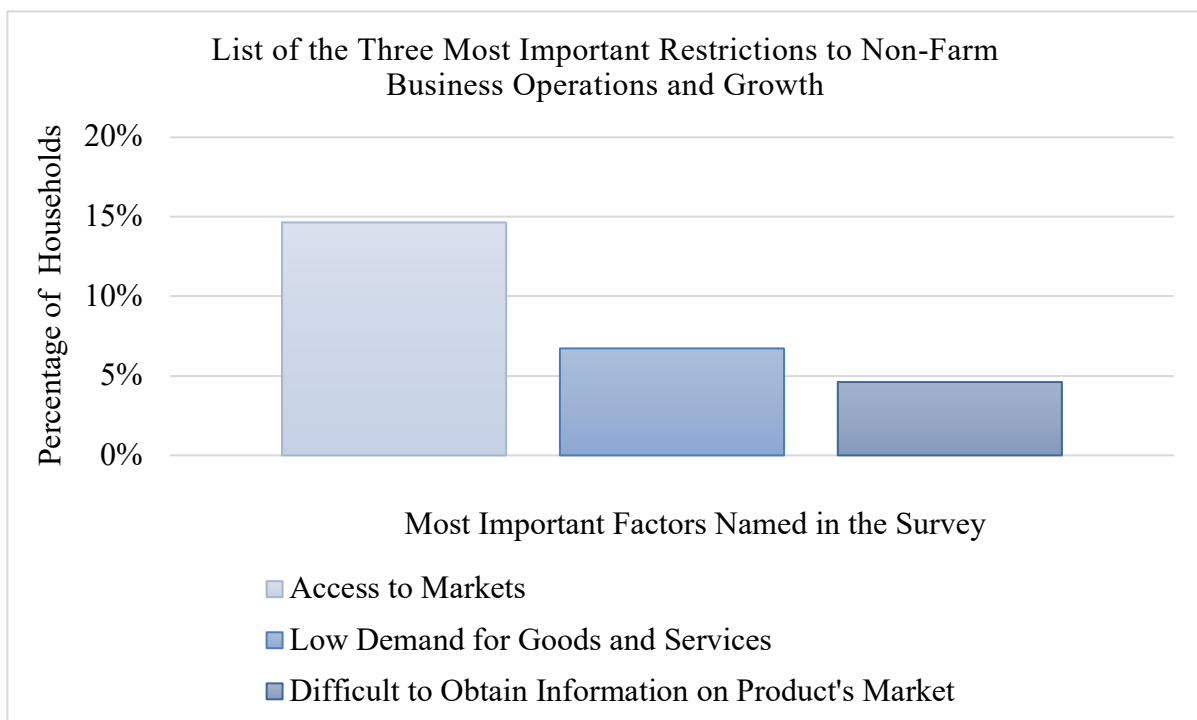

Figure 3: Important Restrictions for Non-Farm Enterprises in Ethiopia, own calculation based on CSA (2017)

Appendix B

Table 7: Correlation-Matrix for Uganda

Variables	Shock	Some Schooling	Junior High School	High School	Above High School	Sex	Age	Asset Value	Land Holdings	Electricity	Adults in Household	Livestock	Population Density	Soil Quality	Class	Road Distance	Market Distance
Shock	1.000																
Some Schooling	-0.029	1.000															
Junior High School	0.015	-0.322	1.000														
High School	-0.038	-0.312	-0.146	1.000													
Above High School	0.005	-0.156	-0.073	-0.071	1.000												
Sex	-0.027	0.121	-0.007	-0.097	-0.092	1.000											
Age	-0.002	0.145	0.086	-0.008	0.035	0.093	1.000										
Asset Value	0.006	-0.062	0.032	0.036	0.096	-0.007	0.044	1.000									
Land Holdings	0.074	-0.039	0.022	0.019	0.008	-0.034	0.028	0.099	1.000								
Electricity	-0.068	-0.076	0.001	0.037	0.099	-0.027	0.005	0.222	-0.009	1.000							
Adults in Household	0.043	-0.132	-0.039	0.030	0.009	-0.141	-0.073	0.255	0.068	0.049	1.000						
Livestock	0.211	-0.049	0.012	0.020	0.033	-0.062	0.002	0.212	0.172	-0.023	0.262	1.000					
Population Density	-0.246	-0.050	-0.005	0.038	0.011	0.012	0.012	0.056	-0.115	0.159	0.034	-0.148	1.000				
Soil Quality	0.119	-0.024	-0.020	-0.009	-0.008	-0.019	-0.014	0.013	0.123	-0.041	0.033	0.166	-0.100	1.000			
Class	-0.056	-0.042	0.011	0.093	0.208	-0.177	0.048	0.044	-0.031	0.082	-0.035	-0.057	0.039	-0.095	1.000		
Road Distance	-0.056	-0.054	-0.008	-0.013	-0.038	-0.004	-0.048	-0.072	0.008	-0.038	-0.030	0.008	0.040	0.064	-0.059	1.000	
Market Distance	0.017	-0.016	-0.040	0.012	-0.028	-0.008	-0.023	-0.038	-0.012	-0.071	0.016	0.010	-0.064	0.043	0.021	0.216	1.000

Table 8: Correlation-Matrix for Ethiopia

Variables	Sex	Age	Shock	Electricity	Adults in Household	Land Holdings	Some Schooling	Junior High	High School	Above High School	Livestock	Population Density	Road Distance	Market Distance	Soil Quality	Class	Bank Account	Consumption Expenditure
Sex	1.000																	
Age	0.062	1.000																
Shock	0.016	0.063	1.000															
Electricity	0.046	-0.037	0.102	1.000														
Adults in Household	-0.171	0.175	-0.005	0.025	1.000													
Land Holdings	-0.039	-0.001	-0.027	-0.026	0.028	1.000												
Some Schooling	-0.161	-0.092	0.069	0.075	0.041	-0.014	1.000											
Junior High	-0.093	-0.134	-0.043	0.068	0.069	-0.005	-0.092	1.000										
High School	-0.019	-0.086	-0.031	0.097	0.092	-0.006	-0.046	-0.023	1.000									
Above High School	0.075	-0.114	-0.040	0.172	0.008	-0.025	-0.072	-0.027	-0.013	1.000								
Livestock	-0.119	0.066	0.051	-0.040	0.210	0.093	0.028	0.033	-0.008	-0.070	1.000							
Population Density	0.038	-0.015	0.018	0.158	-0.022	-0.018	0.015	0.004	0.002	0.144	-0.080	1.000						
Road Distance	-0.002	-0.042	0.036	-0.093	-0.090	-0.001	-0.054	-0.019	-0.039	-0.034	0.062	-0.087	1.000					
Market Distance	-0.054	-0.003	-0.095	-0.183	-0.007	-0.007	-0.090	-0.043	-0.032	-0.019	0.041	-0.056	0.343	1.000				
Soil Quality	-0.009	0.028	0.058	0.044	0.035	-0.014	0.018	-0.033	-0.037	-0.038	0.067	0.056	-0.097	-0.015	1.000			
Class	0.132	-0.207	-0.032	0.185	0.046	-0.029	-0.060	-0.007	0.094	0.456	-0.043	0.177	0.000	-0.008	-0.024	1.000		
Bank Account	-0.038	-0.060	-0.061	0.180	-0.002	0.000	-0.036	0.050	0.090	0.294	-0.024	0.125	-0.031	-0.008	0.000	0.274	1.000	
Consumption Expenditure	-0.085	-0.063	-0.043	0.306	0.272	0.012	0.073	0.138	0.085	0.198	0.105	0.163	-0.054	-0.093	0.037	0.157	0.207	1.000

Table 9: Variance Inflation Factor for Uganda and Ethiopia

Variables	(1) VIF Uganda	(2) 1/VIF Uganda	(1) VIF Ethiopia	(1) 1/VIF Ethiopia
Shock	1.12	0,9	1.05	0.95
Some Schooling	1.51	0,66	1.09	0.91
Junior High School	1.31	0,77	1.08	0.92
High School	1.27	0.79	1.05	0.95
Above High School	1.12	0.90	1.19	0.84
Sex	1.05	0.95	1.10	0.91
Age	1.07	0.93	1.12	0.90
Asset Value	1.18	0.85		
Consumption Expenditure			1.32	0.76
Land Holdings	1.06	0.95	1.01	0.99
Electricity	1.09	0.91	1.21	0.82
Adults in Household	1.18	0.85	1.22	0.82
Livestock	1.21	0.82	1.10	0.91
Population Density	1.13	0.89	1.08	0.93
Soil Quality	1.06	0.95	1.03	0.97
Road Distance	1.08	0.93	1.18	0.85
Market Distance	1.06	0.94	1.19	0.84
Bank Account			1.16	0.86

Appendix C

Table 10: Robustness Check for Uganda

Variables	(1) Farm Employment	(2) Non-Farm Wage Employment	(3) Non-Farm Self-Employment
Shock	0.0139	-0.0024	-0.0115
	(0.0124)	(0.0104)	(0.0075)
Some Schooling	-0.0374	0.0262	0.0112
	(0.0154)**	(0.0140)*	(0.0088)
Junior High School	-0.0660	0.0576	0.0085
	(0.0186)***	(0.0165)***	(0.0108)
High School	-0.0952	0.0734	0.0218
	(0.0156)***	(0.0138)***	(0.0093)**
Above High School	-0.1874	0.1544	0.0330
	(0.0201)***	(0.0172)***	(0.0120)***
Sex	0.1029	-0.0810	-0.0219
	(0.0107)***	(0.0099)***	(0.0061)***
Age	0.0000	-0.0008	0.0007
	(0.0004)	(0.0003)**	(0.0002)***
Asset Value	-0.0000	0.0000	0.0000
	(0.0000)*	(0.0000)	(0.0000)***
Land Holdings	0.0048	0.0004	-0.0052
	(0.0022)**	(0.0015)	(0.0019)***
Adults in Household	0.0037	0.0015	-0.0053
	(0.0028)	(0.0021)	(0.0020)***
Livestock	0.0012	-0.0012	0.0001
	(0.0004)**	(0.0005)***	(0.0001)
Population Density	-0.0001	0.0001	-0.0000
	(0.0000)**	(0.0000)***	(0.0000)
Soil Quality	0.0251	-0.0185	-0.0066
	(0.0096)***	(0.0082)**	(0.0060)
Road Distance	0.0003	-0.0003	0.0000
	(0.0001)***	(0.0001)***	(0.0001)
Market Distance	-0.0026	0.0020	0.0007
	(0.0007)***	(0.0006)***	(0.0004)
1.Region	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)
2.Region	0.0061	0.0069	-0.0129
	(0.0145)	(0.0109)	(0.0102)
3.Region	-0.0461	0.0501	-0.0041
	(0.0156)***	(0.0129)***	(0.0099)
4.Region	-0.0364	0.0449	-0.0085
	(0.0166)**	(0.0137)***	(0.0105)
N	3,027	3,027	3,027

Robust standard errors in parentheses

* p<0.1; ** p<0.05; *** p<0.01

Table 11: Robustness Checks for Ethiopia

Variables	(1) Farm Employment	(2) Non-Farm Wage Employment	(3) Non-Farm Self-Employment
Shock	0.0053	-0.0043	-0.0010
	(0.0076)	(0.0073)	(0.0049)
Some Schooling	-0.0116	0.0185	-0.0069
	(0.0096)	(0.0095)*	(0.0081)
Junior High School	0.0004	-0.0110	0.0107
	(0.0107)	(0.0112)	(0.0068)
High School	-0.0462	0.0302	0.0160
	(0.0126)***	(0.0124)**	(0.0077)**
Above High School	-0.1072	0.0770	0.0303
	(0.0108)***	(0.0108)***	(0.0066)***
Sex	-0.0437	0.0309	0.0128
	(0.0078)***	(0.0075)***	(0.0049)***
Age	0.0032	-0.0027	-0.0006
	(0.0004)***	(0.0004)***	(0.0002)***
Consumption Expenditure	-0.0000	0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)
Land Holdings	0.0090	-0.0076	-0.0015
	(0.0018)***	(0.0018)***	(0.0012)
Electricity	-0.0202	0.0074	0.0128
	(0.0084)**	(0.0083)	(0.0060)**
Adults in the Household	-0.0146	0.0085	0.0062
	(0.0026)***	(0.0026)***	(0.0016)***
Livestock	-0.0006	0.0008	-0.0003
	(0.0003)*	(0.0003)***	(0.0003)
Population Density	-0.0000	0.0000	-0.0000
	(0.0000)***	(0.0000)***	(0.0000)
Soil Quality	0.0142	-0.0067	-0.0075
	(0.0079)*	(0.0077)	(0.0053)
Road Distance	-0.0003	0.0004	-0.0002
	(0.0002)	(0.0002)**	(0.0001)
Market Distance	-0.0001	-0.0000	0.0002
	(0.0001)	(0.0001)	(0.0001)**
Bank Account	-0.0430	0.0267	0.0162
	(0.0085)***	(0.0086)***	(0.0061)***
1.RegionCode	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)
2.RegionCode	0.0532	-0.0293	-0.0239
	(0.0165)***	(0.0150)*	(0.0133)*
3.RegionCode	0.0500	-0.0188	-0.0312
	(0.0113)***	(0.0102)*	(0.0085)***
4.RegionCode	0.0742	-0.0503	-0.0239
	(0.0141)***	(0.0122)***	(0.0122)**
N	2,763	2,763	2,763

Robust standard errors in parentheses

* p<0.1; ** p<0.05; *** p<0.01