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Filippa Pyk

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Filippa Pyk

Supervisor: Assem Abu Hatab, Swedish University of Agricultural Sciences, Department of Economics

Examiner: Robert Hart, Swedish University of Agricultural Sciences, Department of Economics

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Filippa Pyk

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Abstract

This study aimed to identify the major determinants of performance among Fair trade certified small-scale coffee growers in the Kagera region, northwest Tanzania. The analysis is based on survey data collected through field interviews with a sample of Tanzanian Fair trade certified farmers during the period March-April 2017. The standard regression model was used to find what affects annual revenue and productivity. The estimation results suggest that experience within farming and coffee plot size have a positive effect on annual coffee revenue. Likewise the farmers perceived importance of NGOs is estimated to have a positive impact on revenue. Perceived access to financial support however showed to have a negative impact on revenue. Further, experience within the farming business showed to have a negative impact on coffee productivity. Perceived access to financial support and extension service also showed to negatively affect productivity. The estimated result for determinants of productivity likely suffers from simultaneous bias and should be interpreted with caution.

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LIST OF ABBREVIATIONS

GVC – Global value chain
FT – Fair trade
TMCB – Tanzanian Marketing Coffee Board
KPD Plc – Kaderes Pleasant Development public limited company
SSA – South Saharan Africa

1 Introduction

Globally, coffee is one of the most valuable tropical crops that contribute significantly to national incomes, employment, poverty reduction, food security and sustainable development in many countries (Mbowe *et al.* 2014, UNCTAD 2009). According to Jha *et al.* (2011), the global coffee industry is based on up to 25 million producers and around 75 million coffee harvesters, processors, and industry workers whose livelihoods depend on coffee in some way. Coffee beans are exclusively grown in developing regions, with Sub Saharan Africa (SSA) being the region with the largest number of coffee producing countries (ICO 2015). In 2015, SSA accounted for about 14 % of the total global coffee supply and around 11 % of global exports (ICO 2015). Moreover, coffee in SSA is grown and produced mainly by smallholder farmers who account at least for 70 % of total coffee supply (Schrot *et al.* 2009). It is therefore well documented that coffee can effectively contribute to broad-based economic growth, poverty reduction, food security and sustainable development in SSA (Achterbosch *et al.* 2014).

Despite the importance of coffee and its potential role in SSA's economic growth and sustainable development, several studies have shown that coffee farmers in the region suffer from increasing challenges related to price fluctuations and declining relative prices (Bacon *et al.* 2008). Petit (2007) attributes this situation to structural changes and unequal bargaining power between the global South and North. Brown (2001) illustrates that the global trading system is geared partly towards exploitation of cheap labour in the developing countries and the maintenance of low consumer prices. This has accordingly constituted a difficult economic environment for many small SSA coffee producers.

Over the past two decades, the commercialization of smallholder agriculture has become a major theme within the debate on strategies that pursue pro-growth in developing countries (Bacon *et al.* 2008). In this framework, development strategies in SSA have emphasised the need for smallholder farmers to be integrated into high value markets. Part of these strategy targets ensuring better prices for small producers of traditional crops, including coffee, to enable them adopt sustainable farming techniques and access better-paying coffee markets of developed countries which, in turn, can be a sound strategy for improving incomes and creating opportunities for economically disadvantaged coffee producers in SSA (Chauvin *et al.* 2017, Pretty *et al.* 2011). In this context, fair-trade (FT) has been regarded an alternative approach to respond to the negative effects of the current international trade settings on disadvantaged producers in developing countries (Borsky and Sparta 2016, Reynolds *et al.* 2007). Particularly, Utting-Chamorro (2005) points out that FT represents an important approach which can adjust the imbalance between coffee supply and demand, the disparity between international coffee prices and producers' wages, and the discrepancy between global trade rules and sustainable development. The basic idea of FT was to create a certification system that guarantees the producer a minimum price for growers and a price premium in exchange for products that fulfil certain production requirements. Consumer awareness has increased demand for FT labelled products and the certification system has expanded with an increased number of member farmers and labelled products (Pierrot *et al.* 2010). Several studies argue for the many advantages for FT producers. For instance, Becchetti and Constantino (2006) show that FT can increase income and employment opportunities, reduce vulnerability to price fluctuations and give producers better access to larger foreign markets and attract higher value. Ruben and Fort (2011) find that FT farmers

makes more in-depth investments and are better in using organic fertilizer in comparison to non-certified farmers.

Despite the rapidly increasing demand for FT labeled coffee as well as several potential gains for FT farmers in developing countries FT coffee yet represent a marginal share in SSA coffee production and global world export (Pirotte *et al.* 2006). Specifically FT coffee calculated for 2 % of world coffee export in 2009 (Dragusanu *et al.* 2014). Moreover, Valkila and Nygren (2009) find that certified coffee producers are only able to sell 30-60 % to the FT market because of poor knowledge on FT standards. Pirotte *et al.* (2006) attribute this to farmer's poor knowledge of quality standards and production techniques, which remain the major challenge to boost the competitiveness of FT coffee in SSA. In the same context, Murray *et al.* (2006) point that many certified farmers lack the capacity needed to produce coffee that fulfills the FT requirements and thus they have to direct proportions of their FT coffee to conventional and domestic market.

1.1 Objective, research question and contribution of the thesis

In recognition of the challenges facing FT and coffee farmers in SSA countries, this present thesis aims to identify the major determinants of farm performance among FT coffee farmers in Tanzania. Moreover, it explores the link between institutions, farmers and the availability of resources that enable small-scale coffee growers to perform and increase influence on the market. Specifically, the main research question that the present thesis aim to answer is; *“What are the major determinants of performance among fair trade coffee farmers in Tanzania?”* The selection of Tanzania is justified by the fact that it represents the fourth largest coffee producing country in Africa, where 90 % of coffee production is supplied by smallholder farmers (ICO 2015, TMCB 2012). Moreover, the coffee sector is an important contributor to the Tanzanian economy while it directly provides income to more than 400 thousand households; livelihood to about 2.4 million people; and contributes to 2.6 % of the country's GDP (TMCB 2012, Parrish *et al.* 2015). Furthermore, in the framework of the recently adapted development strategy “Vision 2025”, the government of Tanzania places special emphasis on the role of coffee production in improving smallholder farmer's incomes, poverty alleviation and empowering rural communities (Rouja 2016).

Moreover, the existing literature on FT in developing countries' context by and large is limited to the investigation of the perceived benefits from FT certification with little effort to explore the performance and success of FT certified farmers (Becchetti and Constantino 2006, Jena *et al.* 2012, Utting-Chamorro 2005). Moreover, Chalu and Nguni (2014) indicate that little work has been done to enable Tanzanian FT coffee farmers to comply with related FT standards and quality requirements and thus improve their on-farm performance and success. There are to my knowledge no recent studies on supply-side determinants or constraints of performance among FT certified small-scale coffee growers in Tanzania. This thesis is expected to contribute to the field by deepening the understanding of key factors that challenge export success of smallholders coffee farmers in Tanzania.

To answer the research question the Ordinary least square (OLS) model has been used to estimate a multiple regression. Performance is defined in annual revenue and productivity where it is assumed that higher revenue and productivity equal higher levels of

performance. The selection of proxy for performance is based on previous literature and data collected during field interviews in March and April 2017. Profit would be a better proxy for performance than revenue, however difficulties to isolate the cost of coffee make revenue better to use. The results of the present thesis are expected to generate knowledge on the challenges that encounter small-scale coffee producers in Tanzania in which could help Tanzanian policymakers develop policies to promote FT among small coffee producers. In addition, it could help the government to achieve the aim of Vision 2025 on poverty alleviation, rural empowerment and economic development. To be able to improve coffee quality and increase the quantity, and at the same time enable development of the rural population, policy makers need to know what characterise those farmers that are performing better than others. Moreover, studying competition and what determines performance is important to understand growth factors and contributors to development within a sector. Finally, better understanding for success factors and constraints among certified farmers is expected to provide valuable insight that will help local organisations and companies that works for social, environmental and economic responsibility to develop.

1.2 Structure of thesis

This thesis is structured as follows; an overview of the Tanzanian coffee sector is given in section 2. Section 3 presents the conceptual framework underlying the study. In section 4, the empirical literature on the determinants of smallholder farmers' performance in developing countries is briefly discussed. Section 5 describes the data collection process and the survey results and it also discusses the econometrics models and estimation procedures. Section 6 provides a descriptive analysis of the survey results, and it also presents and discusses the econometric results. Finally, section 7 summarizes the thesis and draws policy implications.

2 Background of the study

2.1 Fair-trade

The World Fair Trade Organisation (WFTO) was established in early 1990s to constitute the global framework which consists of a network of organisations working for a sustainable supply chain with its goal to fight poverty, climate change and global economic crisis. The FT system builds on consumers' willingness to pay a higher price for an environmentally friendly product that guarantees a consistent contract price for the producer. The crops produced within the system are bought from registered and certified smallholder cooperatives and exported to developed countries. Except for the price guarantee, it includes a price premium that is given to the farmers with the aim to cover necessary production costs and support development of the farmers' communities. Consumers concerns over the environment and socio-economic factors which farmers in developing countries face have driven a strong growth in sustainability oriented standards and labels (Pierrot *et al.* 2010). Alongside this trend, the demand for FT labelled products has grown rapidly over the last decades (Raynold 2000, Rice 2001).

The majority of FT coffee producers lives in South Africa, nevertheless many also live in African countries such as Tanzania (FLO 2017). According to Davis (2014), the number of FT producer organisations increased by 16 % between 2011 and 2012, they now

represent more than 1.3 million farmers and workers in 70 countries. 56 % of FT total sale consists of coffee, which therefore implies it is a highly important FT labelled product (Davis 2014).

Several studies looked into FT from a developed countries consumers' perspective. In the majority of these studies, FT is looked at as an ethical product that contributes to economic and social development in low-income countries (Bechetti and Rosati 2007). For instance, De Pelsmacker *et al.* (2006) estimate that Belgian consumers are willing to pay 10 % above the market price for a FT labelled product. This result is supported by the increased demand for FT-labelled products (Rice 2001, Raynolds 2000). Moreover, few studies have focused on identifying farmers' motives for FT adoption (Dragusanu *et al.* 2014). Dragusanu *et al.* (2014) suggest less qualified farmers are selected into FT, which they argue would understate the true causal impact of FT.

From a producer perspective, there is however still no consensus on the impacts of FT certification on producers (Dammert and Mohan 2014). For instance, Raynold *et al.* (2007) find that FT has been successful for development of low-income countries, but it still faces fundamental challenges to become an alternative to other sustainable development strategies. Ruben and Van (2008) argue that the difficulty to identify the impact of FT is due to the lack of baseline studies. Becchetti and Costantinos (2006) claim in their study on Kenyan farmers that FT affiliation is associated with superior capabilities, economic and social wellbeing. However, they also find that more can be done on the human capital side. Valkila and Nygren (2009) claim that it is hard to identify the social benefits from FT, as it cannot be separated from other development programs. Also, they question the ability of FT to offset benefits as many farmers do not have the required capacity to comply with the standards and therefore are not able to sell coffee on the FT market. This is partly in line with Bacon *et al.* (2008) who argues that despite FT involvement, low incomes, high emigration and food insecurity continue to be a problem for coffee smallholders. The inability of FT to improve livelihood could, except for low capacity of the farmers, be explained by Potts *et al.* (2008) who claims that the impact of FT is highly dependent on local conditions in which FT is implemented and enforced.

Cooperatives and its importance for development is another research area within FT, probably because FT-certified smallholders are exclusively organised in cooperatives. Collective actions for market access can help correct for some of the market imperfections smallholders face such as high transaction costs and missing credit markets (Markelova *et al.* 2009). Also, Markelova *et al.* (2009) claim that producer cooperatives enable farmers to get information about the market, reach quality standards and operate on a larger scale. By working together smallholders can pool financial and labour resources that enable them to sell to new domestic or international markets. Jena *et al.* (2012) on the other hand finds that FT certification has a low impact on Ethiopian coffee smallholders livelihood due to (1) low productivity, (2) insignificant price premium, and (3) poor access to credit and information from the cooperative. However, they could see a difference in the achieved benefits between what she suggest as "good and bad" cooperatives.

Despite the disagreement on the effectiveness of FT to economic and social development, Grote and Jena (2017) find that members of a FT-certified cooperatives in India benefits both directly and indirectly from FT. Borsky and Sparta (2016) suggest FT as an alternative

growth policy as it connects low-income and middle-income countries through trade. This argument is supported by Parrish *et al* (2005) who studied how effective FT is as a market approach in comparison to free trade approaches in terms of development of smallholder farmers in Tanzania. They conclude that the strengths of FT are its capability to channel global market forces to increase financial flows to producer organizations and to see those financial resources reinvested in multiple forms at the local level. However, FT proved to be less effective in leveraging organizational benefits at the farmer level.

2.2 Overview of the coffee sector and fair trade in Tanzania

Agriculture is an important sector in the Tanzanian economy as it contributes to about 30 % to the GDP and 80 % of the labour force (World Bank 2016, Potts *et al.* 2011). Nearly three-quarters of the total population of Tanzania live in rural areas and smallholdings make up 80 % of total farms (Rapsomanikis 2015). Moreover, coffee is one of the country's most important agricultural products that add to export earnings and rural employment (ICO 2014). More specifically it counts for about 5 % of total exports to a value of 100 USD; about 2 million people are employed in the coffee sector (Mtaki 2016, TaCRI 2017). Most of the farms are family driven where workers are hired on a seasonal basis; the work is labour intensive and access to technical innovations is rare (Rapsomanikis 2015). Further, smallholders, considered to have between 1.2 to 2 acres of land, produce more than 90 % of the Tanzanian coffee; most coffee is traded on international markets (Parrish *et al* 2005, Potts *et al* 2011).

Despite its contribution to economic and social development, coffee production has not increased in recent years (ICO 2014). Specifically, the Tanzanian Marketing Coffee Board (TMCB) reports that annual production of coffee has stagnated at 50 thousand tons, and the coffee quality has not yet reached its full potential. The stagnant coffee volumes is explained by Potts *et al.* (2011) and USAID (2010) to be because of low productivity, weak agricultural practice and poor access to credit and hence agricultural inputs. Due to the stagnate quantity of coffee exports, TMCB have come up with a development strategy for 2011-2021. Investments will be made in new coffee plants that are more productive than old trees and increased extension service that will improve agriculture practice. The goal is to have annual production at 100 thousand tons in 2021, which is a 100 % increase from 2011. This is argued to raise incomes in the whole value chain as well as increase both quantity and quality. Another challenge for coffee farmers in Tanzania is the low farm gate price for coffee that puts coffee growers in a difficult situation because the cost for coffee production is relatively high (Andrew and Philip 2014). Also, Lewin *et al.* (2004) and Baffes (2005) claim that low prices make it difficult for coffee growers to increase production and hence incomes.

With respect to coffee in Tanzania, the market is strongly based on cooperatives and farmers organizations which serve as a commercial actor that has political influence because of its strong linkage to a large number of farmers (Pirotte *et al.* 2006). In this regard, Raynold *et al.* (2007) illustrate that certified FT producers' organisations shape coffee trade relations. These organizations play an important role in linking producers and consumers and in supporting coffee farmers with useful knowledge in production techniques (Sizya 2001). Available statistics show that the share of certified FT coffee production in the country is yet minimal and it estimates that about only 5 % of the total coffee exports is FT certified (Pirotte *et al* 2006). According to Parrish *et al.* (2005),

minimum prices provided by FT did increase the export value of Tanzanian coffee by 38 % between 2002 and 2003 in comparison to a free market guided business organisation during the same period. Both Pirotte *et al.* (2006) and Parrish *et al.* (2005) argue that it is important to support continued production of FT coffee as it contributes to income growth, increased knowledge and rural development because some portion of the profit is re-invested in local communities. This is strengthened by Potts *et al.* (2011) who find that certified farmers have stronger economic performance with higher yields and more revenues than non-certified farmers; also, they argue that certified farmers have better knowledge in agriculture. Higher incomes enable farmers to predict their incomes and budget for household and farming needs, which in extension could improve coffee quality that is important for export growth of (TMCB 2012, USAID 2010).

3 Review of the literature on the determinants of on-farm performance

Several studies have studied what factors that influence farm performance in developing countries. What can be concluded is that proxies used to estimate performance differ among studies (Chibanda *et al.* 2009). In this context, Mishra *et al.* (1999) suggest that the definition of success should depend partly on the time frame considered and partly on the goal of the farm business and/or farm household. Clarke (1991) and Yvas *et al.* (1989) studied farm performance from a developed countries perspective in which they define performance in form of quality, productivity and technical efficiency. From a smallholder farmer perspective, Seville *et al.* (2016) suggest several indicators for agricultural performance, both economic and non-economic. Suggested non-economic measurements of performance are livelihood, well-being and access to agricultural services. Economic indicator of performance is farm productivity; it is argued as well established however difficult to use in practice because of difficulties to gather data. More specifically, productivity is calculated by dividing farm output with farm size; this information tend to be biased because smallholders does generally not keep record of their harvests and lack accurate information about their farm size. In this context Seville *et al.* (2016) also suggest revenue as a proxy for performance because it captures the profitability aspect of production. Philpott *et al.* (2007) used gross revenue and farmers reported yield to estimate the difference in performance among certified and non-certified coffee farmers in Mexico. Likewise Baur *et al.* (2017) used data on annual milk yield, calving intervals and annual milk income as a measure for Malawi milk producers' on-farm performance. Verhofstad and Maertens (2014) used revenue as a proxy to estimate the impact of cooperatives on smallholders' success in Rwanda.

The commonly used explanatory variables of farm performance in previous literature are farm and farmer characteristics. Mulie (2014) estimated that land under cultivation and cost of hired labour has a positive impact on profitability of Ethiopian coffee smallholders while cost of family labour and capital have a negative impact on profit. Mulie (2014) also finds that many coffee farmers are performing badly because of poor access to extension service, weak financial institutions and low educational level among the farmers. Andrew and Philip (2014) have studied performance from another angle and found that coffee quality is a major determinant for Tanzanian coffee farmers' profitability. Coffee quality is highly dependent on agricultural post-harvest process including cleaning, cheering out, drying procedure and storage facilities. Andrew and Philip (2014) also point out that high cost of

coffee production, shortage of extension service and high interest rates for new investments negatively affect the profitability of coffee farmers.

Another aspect of factors that influence coffee production is external factors including institutional capacity and climate change. For instance, Tolera and Gebermedin (2015) identify that lack of physical infrastructure and poor market information has a negative impact on coffee production in SSA. These findings are partly in line with Baffes (2003) who argues that poor communication of coffee research and low quality of extension service is a challenge for the development of the Tanzanian coffee sector. Further, Gathura (2013) shows that government policies and government support are important for coffee production in Kenya. For instance Baffes (2003) argues high taxation is a major problem for coffee production in Tanzania because it leaves coffee producing cooperatives with low profits. Further, coffee production is dependent on certain weather and climate change therefore has a substantial effect on coffee production. What effect climate change has on coffee production is however less clear. Craparo *et al.* (2015) claim that higher temperatures risk causing a substantial drop in coffee production in northern Tanzania. This is not in line with Hagggar and Schepp (2012) who argue climate change will rather increase coffee production but that farmers have a strong belief it will have a negative impact. Table 1 provides an overview on determinants of on-farm performance and smallholder success in export that has been discussed in this section.

Table 1. *Overview of previous literature*

Performance factors	Examples	Sources
Farm size	<ul style="list-style-type: none"> • Low yield due to small cultivation area 	Mulie (2014)
Institutional constraints	<ul style="list-style-type: none"> • Lack of extension service that could affect farming techniques • Lack of government support • Institutional capacity help to protect and promote farmers business 	Mulie (2014); Birachi et al. (2011); Achoja et al. (2012); Baur (2017); Deresa (2016) Verhofstadt and Maertens (2014)
Financial constraints	<ul style="list-style-type: none"> • Inability to access credit for investment • Low capability of farmers to repay loans 	Mulie (2014); Girabi and Mwakaje (2013); Diao and Hazell (2004); Poulton et al (2006)
Human resources constraints	<ul style="list-style-type: none"> • Ability to acquire skilled labour • Educational level • Organisational quality 	Achoja et al. (2012); Edward and Alves (2006); Mulie (2014)
Infrastructure	<ul style="list-style-type: none"> • Poor infrastructure could have negative impact on transportation of crops to market and buy agricultural inputs 	Tolera and Gebermedin (2015); Gebreyesus (2015); Tamene and Megento (2017)
Climate change	<ul style="list-style-type: none"> • Increasing night temperatures could lower coffee yield 	Craparo et al (2015)

Source: Authors own based on previous literature

4 Conceptual framework

FT certified coffee produced by smallholders in Tanzania is exclusively exported and sold on international markets (Lazaro *et al.* 2008). This study can therefore be seen from an international trade perspective where FT certification is shaping producing methods and capacity of the farmers. This thesis explores the link between institutions, farmers and the availability of resources that enable small-scale coffee growers to perform and increase influence on the market. The conceptual framework underlying this study is hence based on the global value chain (GVC) framework by Bolwig *et al.* (2010). GVC analysis is commonly used in previous literature on FT and development strategies (Taylor 2005, Raynolds *et al.* 2007). However Bolwig *et al.* (2010) allow for a deeper analysis that includes vertical and horizontal aspects of GVC, which is of interest when analysing determinants of small-scale coffee growers' performance.

4.1 Global value chain analysis

To start with, GVC can be explained as the relationship between producers and consumers. Moreover, Ponte (2004) argues that GVC is the international structure of production, trade and consumption of goods that are disaggregated into stages that are embedded in a network of activities controlled by firms. The relatively new approach on GVC suggested by Bolwig *et al.* (2010) builds on *vertical* and *horizontal* chains where standards and certification schemes are argued to link the two approaches. FT is interesting to study as it provides certification with two aims, first to improve the livelihood for the single smallholder through the minimum prices, second to create a fair and sustainable global trade system by ensuring good working conditions and sustainable farming techniques. The analysis of the present thesis is focused on the very first production stage, cultivation of coffee beans. From an environmental economics perspective, this is of relevance as production and trade has a significant effect on both the environment and economic development.

The vertical aspect is that production follows a chain of stages from the primary product to the final good sold on the market. The aspect also states that there exists a flow of resources in terms of materials, knowledge and finances throughout the production chain. Fitter and Kaplinsky (2001) give a brief overview of the coffee value chain. First, coffee beans are cultivated in developing regions and the first processing of the bean often takes place in nearby coffee factories. Secondly, the beans are exported to international markets where the importers sell it to roasters for further processing before the coffee is available to consumers in the supermarkets. The world coffee supply chain is, according to Ponte (2004) and Gereffi and Fernandez-Stark (2011), characterized by inequality where the cultivation of beans is decentralized from the value-added process, which takes place in developed countries. Moreover, the connection between actors in the different production stages is poor. In order to strengthen small-scale coffee growers they need to be incorporated into the global market, in GVC commonly known as upgrading. The exclusion of the value-added process leaves the farmers with a low price, which in extension have a negative impact on smallholders' incomes. From a vertical GVC perspective, standards are important for smallholders to access international market because it enables entrance to speciality markets that allows for higher prices and increased exchange of knowledge (Borsky and Spata 2016).

Except for the more common approach on vertical commodity chains, Bolwig *et al.* (2010) introduce the horizontal aspect where focus is on the role of co-ordination and competition between actors that operate in the same function or segment. Moreover, farmers' ability to increase revenues through improved productivity depends on the resources available and support from local institutions, government and other economic actors. High level of institutional capacity enables better performance as more information, increased knowledge and availability of finances enable good agriculture practice and new investments. Also, performance depends on the existing actors in the same business because competition can either outperform actors with less capacity or strengthen competitors through knowledge exchange (Selwyn 2008). This is reinforced by Humphrey and Schmitz (2000) who emphasize the importance to understand institutional support and the local environment of smallholders. From a horizontal point of view, certifications and producer standards adds entry barriers and tightens competition between existing suppliers. This is because some farmers are more capable to comply with the standards, which could outperform others. In neoclassical economic theory, competition is a processes whereby actors try to increase their market influence through differentiate their performance.

In the present thesis, farm and farmers' characteristics together with the availability of extension service, skilled labour, financial support and institutions are suggested as determinants of smallholders' performance. The standards and design of FT is seen from the vertical aspect, where the organisation helps farmers to improve their capacity and enables them access to the international market with high quantities of coffee. The level of knowledge determines the quality and hence the price and market the coffee is sold on; this by extension affects their coffee revenues. From a horizontal perspective, the capacity of the farmer depends on institutional support and on the capacity and availability of support to other farmers working in the same segment. In order to get a deeper understanding for determinants of performance, one cannot study the performance of one farmer without having in mind the context where the farmer is active in. Therefore, the focus of this thesis is to identify the social and economic constraints that hinder FT certified small-scale coffee growers to improve market power and "move up" the value chain; both from an vertical and horizontal aspect. However, the analysis is based on local characteristics and challenges that are faced by smallholders therefore the horizontal aspect is most relevant.

5 Data and data collection process

This section describes survey design and data collection process and analyses the survey results.

5.1 Survey area

The study was carried out in the Kagera region, which is one out of the total 31 regions in Tanzania. It is located in the Northwest of the country and bordering Rwanda, Uganda and Burundi. The landscape is characterized by hills and fertile soil, which makes it suitable for farming and agricultural businesses in comparison to other dry regions of the country. The data collection process took place between March and April 2017 and the field interviews were carried out in two of the eight districts in the Kagera region, namely: Karagwe and Kwyera. Population of these two districts represents for about 27 % of the total population in the Kagera region. Small-scale farming is the main source of income for the majority of the households. Although sugar and coffee are widely cultivated in the Kagera region, coffee is the only cash crop produced and exported under FT-certification system from the districts studied. This highlights the important role that coffee contributes to household income, poverty reduction and food security in the region.

5.2 Questionnaire and data collection process

In light of the findings of existing literature on the performance of smallholder farmers in developing countries, a questionnaire was designed to collect the required data for this investigation. The questionnaire consisted of six main sections including: 1) general information about the farmers and their farms, 2) their objective for FT adoption, 3) the role of institutional support, 4) constraints and challenges for FT coffee production, 5) gained benefits from FT certification and 6) farmers perception about their future FT business. Questions on the financial aspect of FT were included in the first section on general information about the farmers business. Revenue was asked in several steps where the farmers were first asked about their annual production (number of bags) and then the price they sold each bag for. Quantity and price was then multiplied to get the annual revenue; coffee is only harvested once a year. For annual costs, several categories of costs were presented and the farmers' were asked to estimate they annual cost for each categories. Local experts suggested the categories. Further, the data on suggested constraints to coffee production is based on farmers' stated preferences, which means it is the farmers' perceived idea about the constraints and not the "true" constraints. For instance, one suggested constraint to production is the availability of financial support; the data hence captures the farmers' idea about the availability of finances and not the "true" access to finance. This is important to have in mind while interpreting the result as there is a risk that the results suffers from bias if the questions and suggested constraints are interpreted differently among the respondents. The full questionnaire can be found in in Appendix 10.2.

The questionnaire was revised several times in discussion with my academic supervisor before going to Tanzania. Before the initiation of the field data collection process, the questionnaire was further discussed and revised in collaboration with local experts and the interpreter. A pilot test with four farmers was carried out prior to the actual interviews to ensure that the farmers understood the questions correctly and to make sure no important questions were left out.

Only farm owners that are certified FT through KPD Plc participated. KPD Plc has divided the two districts into 10 different zones in which the interviews took place. Due to the limited time and budget, 3 of the zones were left out; farmers were compensated for the travel cost and therefore those with shorter distance to the interview place were prioritised. A field officer that is working with the farmers made the selection of farmers. The field officers were informed a few days in advance that an interview with farmers was about to be held. The field officers were told to prioritize farmers close to the interview place. To minimize selection bias, neither the field officers nor the farmers knew what the interview was about before they arrived.

The predetermined sample size was 200 interviews, however bad weather conditions and absence of farmers due to unknown reason enabled the final sample of 148 farmers. Before the interviews, the farmers were informed about the objectives of the study and the structure of the questionnaire. The farmers' English and reading skills are limited and therefore an interpreter who works for KPD Plc was doing the translation. All interviews were made individually to minimize the risk of answers being dependent on other respondent's answers.

5.3 Descriptive statistics of sample

5.3.1 Respondents' and farm characteristics

Out of the 148 interviewed farmers, the sample consisted of 123 male and 25 female farmers who all represent the main responsible for their farms. The average age of the respondents revolve around 46 years old with around 64 % being in the age group 36-55. In terms of education, the results show that 86 % of the surveyed farmers has primary education, whereas only 12 % has completed secondary education. However, the majority of the farmers have a long experience in the farming business while 76 % of them have been working as farmers for more than 20 years. Nevertheless, their experience within FT farming is much lower, 56 % have less than 5 years of experience and the other 44 % have 5-10 years of experience. This can be explained by the fact that KPD Plc was granted FT certification in 2011, and certified the first farmers in 2012. All farmers hold both the organic and FT certification and everyone cultivates coffee. Except for coffee, most farmers also cultivate green bananas, maize and beans. Few farmers also grow and sell avocado, pineapple and cassava. About 50 % of annual farm revenue comes from coffee followed by green bananas that represent 22 %; revenues from maize and beans are of equal size. The surveyed farmers employ on average 3-4 workers, including both family labour and seasonal (external) workers. The mean farm size is slightly above 4 acres. However, the farm size that is certified FT is slightly smaller than 4 acres. The mean area devoted to coffee is a bit more than 3 acres. Some of the farmers have certified their whole plot even though they did not cultivate coffee on the total area that is certified. However, they do not cultivate any other crops under FT certification. The average plot size for a FT certified coffee farmer in Africa is 0.8 hectares (1.9 acres) and the average certified coffee plot worldwide is 1.4 hectares (3.5 acres) (FLO 2015). This means that the sample used in this study owns more land devoted to coffee in comparison to other farmers in Africa, but matches well with the global average.

5.3.2 Farm profit and revenue

While all surveyed farmers practice intercropping, by growing two or more crops simultaneously on the same field, it has been a challenge to calculate farmer's profits from the FT coffee business due to the difficulty to isolate the production of each crop. To cope with this, the study assumed that the production cost for coffee is also the cost of producing other crops. The assumption is strengthened by the fact that 75 % of the farmers would experience losses if their profit were calculated by subtracting their stated cost of coffee production from their coffee revenue. If this assumption holds, the annual average farm profit is 464 USD. However, 29 % of the farmers are still incurring losses and it is likely that they have other sources of income such as livestock. On average, the surveyed farmers achieve annual revenue of 1195 USD from their FT coffee, ranging between a minimum of zero and a maximum of 7958 USD. The zero revenue is attributed to the fact that it takes approximately 5 years for the newly planted coffee trees to begin producing coffee. Further, it should be held in mind that information about the age of the plants are not gathered due to limited time and budget. This mean it is likely that the revenue differs depending on how the age of the tree. Coffee earnings represents on average 50 % of total farmers' revenue from all produced crops within the farm.

5.3.3 Motivations for fair trade certification

To get a deeper understanding of the farmers underlying interest in FT, the respondents were asked to indicate the level of their agreement of 18 statements related to their motivation to get a FT coffee certificate. The responses of the interviewed farmers were recorded on a 4-point Likert scale where answers ranged from strongly agree to strongly disagree. Figure 1 summarizes the main categories of farmers' motivation for FT coffee certification. The vertical axis shows the relative importance in percentages. High percentage indicates that the category was of great importance for adoption. The figure shows that economic motivations are dominating followed by environmental and health concerns. Ethical reasons, NGO-membership and community motives are of equal importance for FT adoption. To clarify, the ethical category means that the farmers wanted to feel better personally and therefore adopted a sustainability certification. NGO membership means that they got involved with FT because they wanted to become a member of KPD Plc. Finally, community motives mean that they adopted FT because they wanted to strengthen the community. By strengthening the community most farmers referred to exchange of knowledge in agriculture practice, however some also mentioned the premium offered by FT, which could be invested in education and clean water. All farmers thought the questionnaire captured their underlying reasons for adoption and did not suggest other motivations.

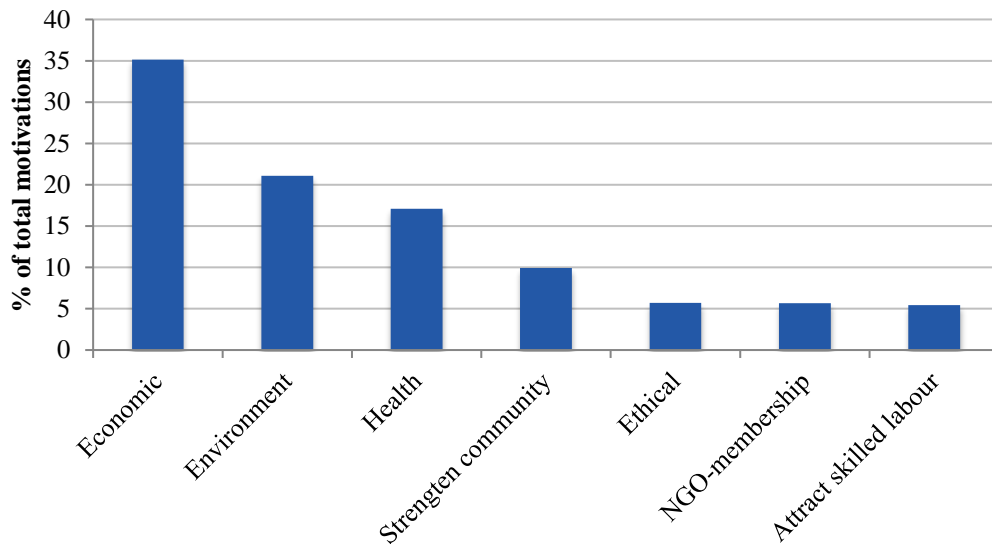


Figure 1: Motivations for fair-trade adoption

5.3.4 Benefits from fair trade involvement

To find how well the farmers underlying motivation for adopting FT-certification matches with the real outcome of involvement with FT, the farmers were asked about the benefits they achieved after adopting the coffee certification. The question was structured in the form of statements where the interviewed farmers were asked how strongly they agreed with the different statements of suggested benefits. The responses were recorded on a 4-point Likert scale where answers ranged from strongly agree to strongly disagree. Figure 2 summarizes the main benefits from involvement in FT. Most farmers have achieved economic benefits including higher price for coffee, higher coffee yield and that they feel less vulnerable to domestic price changes. However many farmers said their production costs have increased. Economic related benefits are followed by environmental benefits. The farmers said they are now planting trees that can absorb carbon dioxide and are using sustainable farming techniques that do not include chemicals. Further, the farmers argued that they have achieved better health because they are not using chemicals on their farmers and hence not get any chemicals in the crops that they grow and eat. Benefits from feeling better personally (ethical benefits), ability to attract skilled labour and stronger community is of equal size.

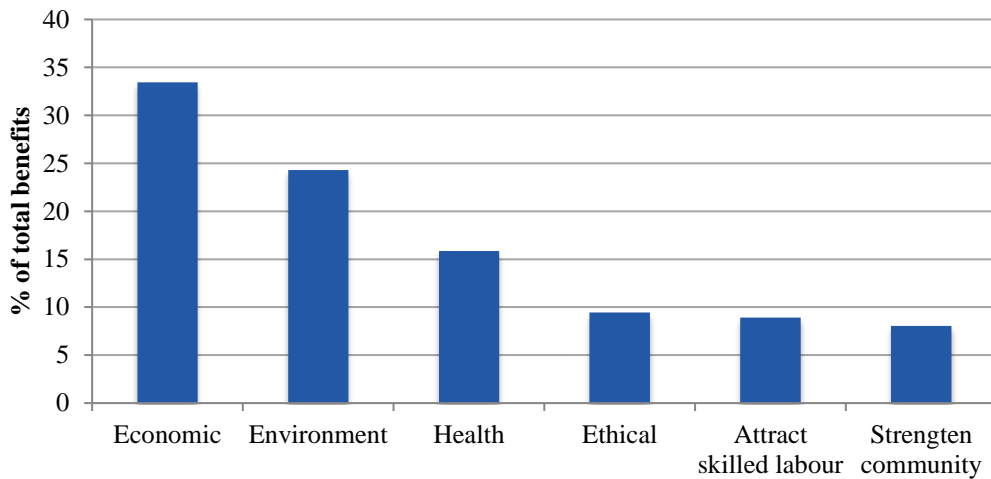


Figure 2: Benefits from fair trade involvement

5.3.5 Constraints to fair trade coffee production

The section was structured in the same way as the previous ones. Constraints to adopt the certification and produce FT coffee were evaluated by the interviewed farmers through a number of related statements by using a 4-point Likert-scale, ranging from strongly disagree to strongly agree. These major constraints were identified based on previous literature presented in Table 1, including infrastructure constraints, financial constraints, human resources constraints including the unavailability of skilled labour, and institutional constraints including the lack of extension service and government support. According to Figure 3, the lack of financial support is considered as the greatest constraint facing small FT coffee farmers. The importance of finances is confirmed by local experts whom work in the area as well as by previous literature on smallholders' performance (Mulie 2014, Girabi and Mwakaje 2013, Edwards and Alves 2006). Extension service is considered as less of a challenge in comparison to the other alternatives. This is likely because of the presence of local NGOs in the area that offer trainings and education in sustainable farming techniques. Yet a number of interviews rated extension services as a major constraint arguing that there is still need for more in-field support to help them fulfil the FT requirements.

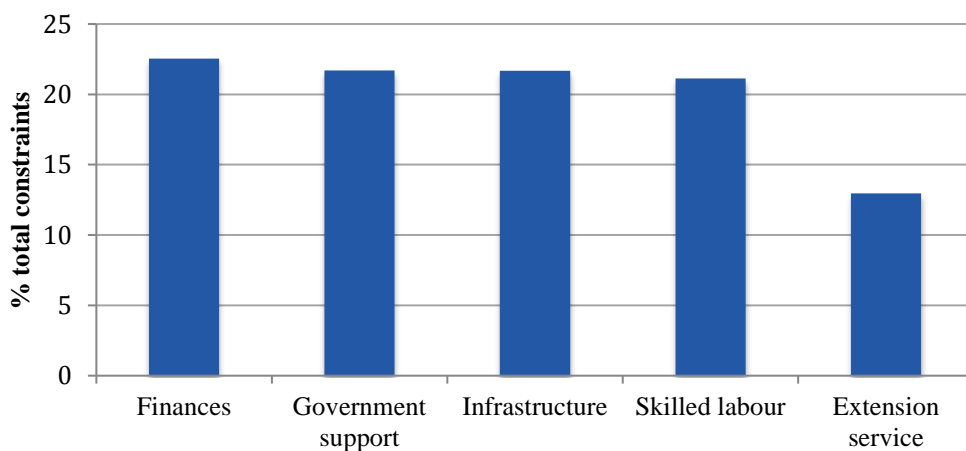


Figure 2: Perceived constraints to production

Besides these major categories of constraints, many interviewed farmers pointed out that both pests and diseases together with climate change are increasingly becoming a major challenge to their FT coffee cultivation. Last year the region faced a drought that had serious effects on the coffee harvest. Questions on pests, diseases and climate change was not covered in the questionnaire but something the respondents added as a perceived constraint to meet the FT requirements.

5.3.6 Future of fair trade certified coffee

To explore the perspectives of FT certified coffee business in the study region, interviewed farmers were asked to identify the perceived challenges which restrain them from investing more in FT production. Figure 4 illustrates that changes in the rain season due to climate change is the greatest constraint for farmers' future investment in FT. Moreover, the limited access to financial support and incentives to invest in FT make it hard for farmers to expand their businesses. In this context, the majority of respondents disagrees with the statement that they are "unable to commercialize and realize return on investment", implying that they consider themselves as capable of effectively using finances if it became available to them. Furthermore, lack of government support is regarded by the majority of the farmers as another challenge that holds them back from further investments in FT production. For instance, many farmers suggested that the government should facilitate access to credit. Finally, farm size and the availability of skilled labour represented the least two factors that worry the interviewed farmers regarding future investment in FT. According to local experts, many farmers in the study area have access to larger areas of land than they cultivate; however they cannot expand their coffee plots due to inability to access finance to buy agricultural inputs.

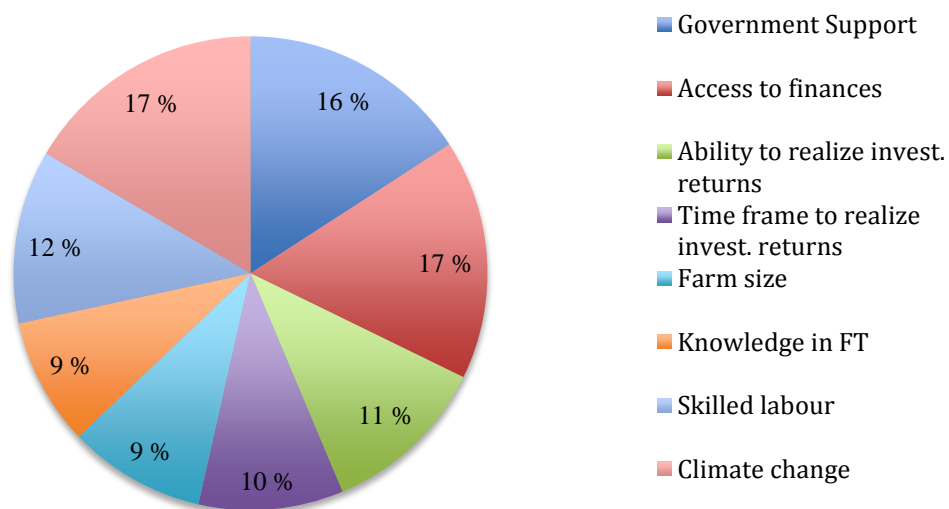


Figure 3: Perceived constraints to future investment in fair trade

Two FT certified producer organisations have been active in the area the last years, Karagwe District Cooperative Union (KDCU) and Kaderes Peasants Development public limited company (KPD Plc); this thesis is made in collaboration with KPD Plc. KPD Plc has been active in the area since 2007 and KDCU since 1990. KPD Plc is driven as an independent company with its roots in the local NGO Kaderes. By today 8000 smallholder coffee farmers are certified both FT and organic through KPD Plc.

Statistics on the exact number of farmers in the districts is rare, however employers at KPD Plc suggest there is more than 450 thousand people employed in small-scale farming. Except for certification service, the organisation provides education in sustainable farming and to some extent offers seeds and seed storage.

6 Methodology

This section discusses the method used to assess the major factors that influence the performance of smallholder coffee farmers in Tanzania.

6.1 Choice of method

In order to identify the major determinants of farm performance among FT certified coffee farmers the Ordinary least squares method (OLS) have been used. Based on previous literature presented in section 3, a number of explanatory variables (X) have been identified as potential determinants of the performance of FT certified farmers and therefore a multiple linear regression has been estimated. The multiple regression model estimates the effect of each explanatory variables on the dependent variable holding the other ones constant (Stock and Watson 2011). The model applied takes the general form and is specified by the following formula:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon \quad (1)$$

Here Y_i represent the dependent variable (revenue and productivity). Table 2 provides descriptive statistics on the dependent variable. Each coefficient β_{1-n} represents the change in Y relative to a one unit change in the respective independent variable, holding all other independent variables constant. For instance, when an explanatory variable is positive and significant that means that the explanatory variables have a positive and significant effect on the farmer performance, all else equal. In contrast, if the explanatory variable is negative and significant that means that variable has a negative impact on farmer performance holding the other variables constant.

6.2 Model specification

In light of the literature review presented in section 3, two multiple regression models were estimated to assess what determines performance among FT certified coffee farmers in Tanzania; the only difference is the choice of proxy variables for performance, annual revenue and productivity. Revenue has been calculated by multiplying annual sold bags of coffee (70 kg) with price per bag. Productivity has been calculated by dividing annual sold bags of coffee with coffee plot size. All values are an approximation by the farmers.

As mentioned in earlier sections, the selection of explanatory variables was based on previous literature findings as well as on other local characteristics that are likely to affect farmers' performance.

In the first model where annual revenue from coffee was used as a proxy for performance; suggested determinants were farm and farmers' characteristics. In the second model, perceived importance of institutions and production constraints were added. Further, a third regression was estimated where productivity was used as a proxy for performance instead of revenue. Like the first model, model 3 first included farm and farmers characteristics

and perceived importance of institutions and production constraints were added in a second step.

6.2.1 Variable selection

Revenue is motivated as a proxy for performance because it captures the profitability aspect of coffee production (Diao and Hazell 2004, Seville *et al.* 2016). Profit could be argued to be a better measure of success than revenue because its inclusion of costs, but the inability to isolate cost for coffee production and hence profit made revenue better to use. The inclusion of productivity as a proxy for performance is based on literature by Seville *et al.* (2016), they argue productivity can be used to measure performance; however they also mentions the difficulties to gather data on yield and plot size. Local experts did however confirm that the gathered data on yield and plot size is correct and therefore productivity has been used as a proxy for performance. Before creating the productivity variable, two outliers were dropped (quantity>100 bags, plot size>15 acres), this was done to avoid biased estimates of the dependent variable. Table 2 gives an overview of descriptive statistics on the two dependent variables.

Table 2: Descriptive statistics on the dependent variable

Dependent variable	Mean	STD	Min.	Max.
Annual revenue (USD)	1161.519	974.299	53.053	6366.308
Productivity (bags/acre plot size)	8.96	9.889	0.5	70

Source: Author's own calculation. Bags are measure in number of sold bags (70 kg) and plot size is measure in acres.

The explanatory variables of farm performance are based on previous literature presented in Table 1 and local characteristics suggested by experts from the area. Table 3 presents a brief explanation of the variables included in the models used for this study. Variables (j)-(n) are measured on a four point Likert scale that range from very low satisfaction to very high, for more details see Appendix 10.2. Questions about constraints to production were asked as statements, where the farmer was asked to state their level of agreement with the different statements. For instance, “*I find the availability of skilled labour as a constraint to my coffee business*” or “*I find access to finances as a constraint to my coffee business*”, then the farmer stated whether he/she strongly agree, agree, disagree or strongly disagree with that statement. There was also an option for “don’t know” if the farmer did not have an opinion about what was being asked. Climate change was not suggested as a present constraint and therefore data from a question on perceived constraints for future FT cultivation was chosen instead. This variable was also measured on a four point Likert scale where the farmer states how strongly he/she agree on that the inability to predict yield is something that prevent the farmer from investing more in FT.

Table 3: Overview of independent variables used in present thesis

Groups	Independent variables	Brief definition
Farmers characteristics	(a) Experience	<ul style="list-style-type: none"> • Number of years within farming
	(b) Experience Fair trade	<ul style="list-style-type: none"> • Number of years within Fair trade farming
	(c) Coffee area	<ul style="list-style-type: none"> • Size of coffee plot in acres
	(d) Number of workers	<ul style="list-style-type: none"> • Number of employed labour and family labour
	(e) Education	<ul style="list-style-type: none"> • Level of education (Primary, Secondary and Collage)
Institutions	(f) NGO	<ul style="list-style-type: none"> • Perceived importance of NGO
	(g) District Councils	<ul style="list-style-type: none"> • Perceived importance of District Councils
	(h) Tanzanian Marketing Coffee Board (TMCB)	<ul style="list-style-type: none"> • Perceived importance of TMBC
	(i) Ministry of Agricultural Food Security	<ul style="list-style-type: none"> • Perceived importance of Ministry of Agricultural Food Security
Production constraints	(j) Skilled labour	<ul style="list-style-type: none"> • Level of satisfaction with availability of skilled labour
	(k) Finance	<ul style="list-style-type: none"> • Level of satisfaction with financial support
	(l) Extension service	<ul style="list-style-type: none"> • Level of satisfaction with extension service
	(m) Government support	<ul style="list-style-type: none"> • Level of satisfaction with government support
	(n) Climate change	<ul style="list-style-type: none"> • If the inability to predict climate change prevents from future investment in Fair trade

6.2.2 Control variables

Control variables should be included to make the independent variables uncorrelated with the error term (ϵ). Moreover, if there is something uncontrolled for that could affect the causal effect of X_i on Y_i , additional variables are included to minimize the risk for omitted variable bias (OVB). The process of including control variables is the same as for independent variables however the interpretation is different; control variables should not be given a separate interpretation (Stock and Watson 2011) while independent variables can. In the present thesis none of the variables should be seen as control variables as the interest lies in finding what marginal effect each of the included variables have on the dependent variable (revenue and productivity). If more data was available it could have been of interest to include control variables to the independent variables.

6.3 Threats to internal validity

Omitted variable bias (OBV) is when important explanatory variables are left out of the analysis. The bias occurs because regressors are under- or overestimated in order to correct for the missing variables (Stock and Watson 2011). There is unfortunately risk for omitted variable bias in the analysis due to inability to gather data on all possible constraints and explanatory variables to farm performance. Ideally, it would be good to have data on the “real” effect of climate change and the spread of diseases and pests as many farmers suggested these as constraints to production. Moreover, Craparo *et al.* (2015) claims that climate change is likely to affect future Tanzanian coffee production, if this is true for the study area there is a risk that the results suffers from OVB as the variable for climate change used in the analysis only captures the farmers perception about climate change and not the “true” effect of climate change. Other potential important variables left out from the analysis are the farmer’s existing assets and their level of risk aversion. Their existing assets and willingness to take risks are likely to explain previous investments that could have an effect on present performance. However, time and budget limitations did not allow for collection of these types of data.

Measurement error is when there is error in data on the dependent or the independent variable. In the present thesis mainly four potential measurement errors have been identified. First, the translator that was helping with the interviews is hired by KPD Plc, which the farmers knew. Due to this it is possible that the farmers answered what they expected that KPD Plc would want to hear and not gave their true opinion. For instance, as KPD Plc offers extension service, there is a risk that the farmers did not want to complain about this service in case that would affect their future collaboration with the organisation. Secondly, it was suggested by local experts that the farmers might have thought that their responses would affect their ability to access for example finances. More specifically that if they argued they are in great need for money, more money would be available to them. Third, because the suggested constraints are measured with the stated preference method (farmers perception about production constraints), the responses depend on how the respondent interpreted the questions. If the questions were interpreted differently among the respondents, there is risk for bias in the estimates. However, the data collection would

not have been possible without the translator from KPD Plc and it is inevitable that the farmers could interpret the questions slightly differently. Finally, even though local experts confirmed data on yield-and farm size, there is a risk that the farmers has been unable to correctly estimate these which causes bias in the dependent variable productivity.

Further, the inclusion of more than one independent variable risk to cause collinearity between the independent variables. Collinearity is when two or more independent variables are correlated, which could cause imprecisely estimated regressors because of underestimated standard errors (Stock and Watson 2011). To identify the problem with collinearity the relationship between the independent variables can be controlled for and one of the correlating variables should be taken away. No clear correlation between the independent variables have been observed, a table of the correlation can be found in Appendix 10.3, However there is still a risk for autocorrelation and the results should be hence be interpreted with caution due to this.

Finally, the problem with simultaneous bias occurs when the dependent variable (Y_i) and the independent variable (X_i) are mutually dependent. In other words that X_i affects Y_i , but Y_i also affects X_i (Stock and Watson 2011). Simultaneous bias causes inconsistent and inefficient results and when there is risk for such bias the results should be interpreted with caution. Simultaneous bias exists in the present thesis and should be held in mind when interpreting the results. For instance, it is likely that suggested constraints and perceived importance of institutions is a cause of their performance. There are mainly two solutions to the simultaneous problem, randomized controlled experiments and the use of an instrumental variable. However, a randomized controlled experiment is not possible to perform within the time frame for this thesis and the data is too limited to find an instrument variable that is valid.

7 Results and discussion

7.1 Determinants of annual revenue

For the determinant annual revenue, the results of table 4 show that when only including farmers and farm characteristics, farming experience and size of coffee plot have a positive significant effect on annual coffee revenue. Experience is measured in number of years within the farming business, experience increase with five year interval. The result of Model 1 (Table 4) should hence be interpreted as when experience increases with five years, annual revenue increases with 218 USD. It is difficult to analyse the size of this revenue increase however the mean annual revenue, calculated without extreme values, is 1162 USD. This means experience increases annual revenue with 18 % calculated from the mean. Further, coffee area is divided into four categorical groups, with 1-acre interval. The estimated result shows that when coffee plot increases by 1 acre, the farmer increases its annual revenue with 182 USD, or with 15 % calculated from the mean. The highly statistically positive relationship between farm size and coffee revenue could be illustrated by that larger coffee plots indicate that coffee represents a major crop within the farm and this also imply a more specialization in FT certified coffee production which has a positive impact on coffee revenue. The result is partly in line with Achoja *et al.* (2012) who find a positive correlation between farmers' performance and farm size. It is likely though that annual revenue also affects the size of coffee plot as higher revenues enables farmers to

expand the farming area and hence the area devoted to cultivation of coffee. If this is true then the result may suffer from simultaneous bias and the causality should be interpreted with caution.

7.1.1 The effect of adding perceived importance institutions and production constraints

In model 2 (Table 4), the importance of institutions and suggested constraints to coffee production are included as additional explanatory variables. More specifically, suggested institutions were FT-related NGOs, District Councils, the Tanzanian Marketing Coffee Board, and the Ministry of Agricultural Food Security and Cooperatives; suggested constraints to production were the availability of skilled labour, financial support, extension service and government support. The added variables are measured as the farmers' perception about the importance of institutions and the suggested constraints. After including the perceived importance of institutions and suggested constraints the effect of experience and size of coffee plot on performance does not change.

Out of the four institution categories included in the questionnaire the results indicate that only the FT-related NGOs have a statistically significant positive effect on farmers' annual revenue. The marginal effects for the NGOs variable imply that the higher a farmer perceive the importance of NGO, the greater its annual revenue. When the farmers change perception about the importance of NGOs with 1 unit, could be to change from perceive NGOs as important to very important, the annual revenue is estimated to increase by 321 USD. This is a higher revenue increase than the effect of additional years of farming experience or increase in farm plot size. It is very likely that those who highly valued the importance of NGOs have benefited more from the services of FT related NGOs than those that value the importance of these NGOs as low. It is worth to mention that the services of NGOs that are active in the study area mainly focuses on education and extension services, which have apparently enhanced member farmers' knowledge with regards to best practices for coffee production, postharvest techniques and FT standard requirements and this knowledge has subsequently influenced their coffee revenue. The result goes in line with Mulie (2014) and Achoja (2012) who identify the lack of knowledge and poor extension service as a major barrier to efficiency and farm productivity in SSA. However, there is a risk that causality runs in the opposite direction, that those with high revenues valued the importance of NGOs high. If the reverse relationship holds, that those with high revenues values NGOs high, then the result for the importance of NGOs should be interpreted with caution, as there is risk for simultaneous bias.

Finally, the results imply that access to financial support is negatively correlated with annual revenue (10 % level). The marginal effects suggest that when farmers perceive they have better access to financial support, their annual revenue decreases by approximately 182 USD. The result is unexpected as previous studies have found that access to financial support increases smallholders performance with the motivation that finances allow farmers to adapt new farming techniques and enables them to buy high quality agricultural inputs (Diao and Hazell 2004, Girabi and Mwakaje 2013). During the interviews many farmers said they would expand their coffee plot and invest in better agricultural inputs that could increase production if they had access to financial support, which indicates the reverse relationship were expected to hold.

One interpretation of the result could however be unfavourable terms of contracts to the farmer, which risk putting the farmers in debt rather than boosting their agricultural business. Poulton *et al.* (2006) argue that small-scale deposits and loans often lead to very high transaction costs for smallholders in SSA, partly due to poor communication infrastructure. Financial institutions interested in serving smallholder agricultural business face high risks associated with seasonality and irregular cash flow partly due to unexpected events such as droughts, floods and plant diseases (World Bank 2015). This can explain high interest rates faced by farmers. In this context, local experts claimed that many farmers in the study area have taken loans to high interest rates, which could obstruct their ability make repayments and hence negatively affect their farming business. Except for difficulties to repay loans due to high interest rates, Poulton *et al.* (2006) state that there is a risk for smallholders to take loans because financed inputs does not directly lead to higher sales that can be used for repayment of loans. For instance, high quality agricultural inputs does not have a substantial effect on coffee harvest if rainfall is low (Serdeczny *et al.* 2016), which in extension leaves the farmer with small revenues the coming year and hence difficulties for new investments.

Table 4. *Estimated effects of suggested determinants of production on annual revenue from coffee*

VARIABLES	(1)	(2)
Experience within farming	218.3793*** (45.96755)	265.5508*** (60.99024)
Experience within fair trade	10.77856 (111.4993)	42.16933 (110.8841)
Area coffee plot	182.1515*** (40.63753)	175.3113*** (40.55469)
Number of workers	35.63753 (120.4843)	-4.304121 (124.9074)
Level of education	123.8313 (124.9811)	114.3784 (121.7691)
Importance of NGO		320.515*** (85.70809)
Importance of Tanzanian Marketing Coffee Board		-9.6125 (0.837)
Importance of District councils		-68.3181 (0.307)
Importance of the Ministry of Agricultural Food Security		24.2159 (0.674)
Perceived capacity to meet fair trade requirements		40.47447 (148.0829)
Perceived availability of skilled labour		72.44261 (73.50921)
Perceived access to financial support		-181.8* (108.5292)
Perceived availability of extension service and education		-52.20391 (57.61908)
Perceived support from government		-95.68646 (83.93005)
Climate change		20.62354

		(71.42729)
Intercept	-750.7447**	-1414.477**
	396.391	(669.8935)
Adjusted R ²	0.2892	0.3230
Sample size	144	144

Source: Author's calculations based on OLS model results

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

7.2 Determinants of coffee productivity

Estimations for the determinant coffee productivity are presented in Table 5. As mentioned earlier, productivity is calculated by dividing annual number of sold bags (70 kg) with coffee area, therefore coffee area is not included as an independent variable here.

When only including farm and farmers characteristics (excluding coffee area because it is now part of the dependent variable), only experience within the farming business showed to have an effect on productivity. Surprisingly, more experience within the farming business decreases productivity with 3 bags per acre per year; the estimate is significant at the 1 % level. The effect of experience on productivity should however be interpreted with caution as there exists simultaneous bias where farming experience affects productivity (see Appendix 10.4). It is more likely that more experienced farmers have better farming techniques and more productive.

Adding the importance of institutions and suggested constraints to production, perceived access to financial support showed to have a negative impact on the farmers' productivity. More specifically, when farmers find themselves having access to financial support their productivity decreases by approximately 3 bags per acre per year. Likewise for the determinant annual revenue, the negative impact of financial support is unexpected as previous studies has shown that greater access to finances has a positive effect on farmers performance (Diao and Hazell 2004, Girabi and Mwakaje 2013). The result could however be explained in the same way as for the determinant annual revenue, that bad terms of contracts disable farmers to increase production because they cannot repay their loans or the investments does not generate the expected output.

Further, the estimated result of Table 5 reveals that perceived availability of education and extension service also have a negative impact on productivity. Moreover that when farmers find extension service and education as less of a problem to production the coffee productivity decreases by little more than 1 bag per acre per year. This result is also unexpected as Mulie (2014) and Achoja (2012) identified lack of knowledge and poor extension service as major barriers to agricultural production in SSA. To my knowledge there are no previous studies that show more education and extension service has a negative impact on farmers performance. This result does however suffer from simultaneous bias (see Appendix 10.4), and the result should be very carefully interpreted. It is also likely that the estimate is wrong because of measurement errors in data for yield- and farm size, this would then cause errors in variable bias. Seville *et al.* (2016) highlight the difficulties in gather data on yield/farm size because smallholders are not always carefully keeping tracks on those two.

Table 5. *Estimated effects of suggested determinants of coffee productivity*

VARIABLES	(1)	(2)
Experience within farming	-3.1188*** (0.9803)	-3.2549 (2.1647)
Experience within fair trade	-1.1495 (1.4057)	-1.4488 (1.2571)
Number of workers	1.5046 (1.2200)	1.0661 (1.1914)
Level of education	0.1721 (2.0100)	0.3467 (1.5212)
Importance of NGO		-2.5478 (2.2062)
Importance of Tanzanian Marketing Coffee Board		0.1984 (0.8193)
Importance of District councils		-0.7869 (0.9128)
Importance of the Ministry of Agricultural Food Security		-0.3824 (1.0073)
Perceived availability of skilled labour		1.0928 (0.6624)
Perceived access to financial support		-2.9634** (1.3775)
Perceived availability of extension service and education		-1.3825** (0.6582)
Perceived support from government		1.1122 (0.6976)
Climate change		-1.5119 (1.0790)
Perceived capacity to meet fair trade requirements		0.7391 (1.9666)
Intercept	21.7238** (9.8409)	41.6464** (18.4364)
Additional independent variables	No	Yes
Adjusted R ²	0.0799	0.1918
Sample size	142	142

Source: Author's calculations based on OLS model results

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

8 Summary, conclusions and policy implications

The purpose of this thesis was to identify the major determinants of farm performance among Fair-trade certified coffee farmers in the Kagera region, northwest Tanzania. The objective was to observe what constraints smallholders face in their production in order to increase their revenues and productivity. Moreover, a regression model estimated by OLS was applied to find what determines annual revenue and productivity. The suggested determinants was motivated by previous literature and included farm and farmers characteristics, importance of institutions, and production constraints including availability of skilled labour, access to financial support, education and extension service and government support. The production constraint was measured with the stated preference method where the farmers responded their level of agreement with four different statements ranging from strongly agree to strongly disagree.

Experience, measured in number of years in the farming business showed to have a positive impact on annual revenue; when experience increased with 5 years the annual revenue was estimated to increase with 266 USD. The relationship is logic as one can expect that more experienced farmers have more knowledge in coffee production and can hence produce high quantity coffee with good quality. Likewise coffee plot size has a positive impact on revenue, when plot size increases with 1 acre, revenue increase with 175 USD. This can be interpreted as those with larger areas of land devoted to coffee puts more effort in to their coffee production, which in extension gives high coffee revenues. The causality should however be interpreted with caution as the reverse relation could hold and then cause bias in the estimations.

From an institutional perspective, NGOs showed to have a positive impact on farmers performance where it is assumed that those that benefit from NGOs are doing better than those that does not. When farmers change their perception about the importance of NGOs, their revenue increases by 321 USD. Change their perception means they go, for instance, from valuate NGOs as “important” to “very important”. NGOs work as an important link between producers and sellers from which it can be concluded that NGOs encourages improved cultivation of coffee beans. In light of the conceptual framework presented in section 4, the importance of NGOs strengthens the horizontal aspect of FT certification; farmers’ ability to perform depends on their capacity to assimilate information during trainings offered by local NGOs. Despite the estimated importance of NGOs, the descriptive statistics show that many farmers do not consider extension services as a challenge to their coffee production. In this context, one could expect that the majority of the respondents do not lack extension service, but that access to it is what distinguishes those that are doing better from those that are doing worse. There is however risk for simultaneous bias in the estimates, not only NGO membership affects annual revenue but revenue affects how satisfied the farmers are with their NGO membership; therefore the result should be interpreted with caution.

Furthermore, smallholders are suggested to meet several constraints. The availability of finances showed unexpectedly to have a negative impact on farmers’ performance, both measured as revenue and productivity. The marginal effect suggests that when farmers have better access to financial support the annual revenue decreases by 181 USD and their productivity with 3 bags per year and acre. This can be explained by unfavourable terms of contract to the farmer; that high interest rates and/or difficulties for farmers to repay loans have a negative impact on production. In other words, if the interest rate is too high or investment does not generate the expected revenue there is a risk the farmers cannot repay loans which in extension affect on-farm investments for the next coming season and hence production. The financial terms of contract represent both the vertical and horizontal aspect of a producer certification. On the one hand terms of contracts depends on local characteristics and competitors in the same segment, on the other hand it can be controlled by actors “higher” in the production chain as part of FT is to offer loans with good conditions to its members. The second suggested constraint that showed to significantly affect performance is availability of education and extension service. Unexpectedly, when farmers find education and extension service more available to them, the productivity decreases by about 1,5 bags per year. No explanation could be given to this result and there is likely bias in the estimates and the result should therefore be interpreted with caution.

To improve performance of smallholder coffee farmers in Tanzania, policy recommendations are presented here. The results of this thesis suggest that access to financial support have a negative impact on farm performance. If this can be explained by high interest rates or difficulties to repay loans due to unpredictable farm revenues it is of importance to either lower the interest rates or to implement an insurance system that can secure investments. Further, the results reveal that NGOs are important for smallholders coffee business. By supporting local producer organisations (which can educate smallholders in agriculture practice and agri-business), smallholders are likely to increase harvest and hence quantity exported. Increased production of FT coffee does not only boost the farmers' incomes it also boost farmers local communities through the FT price premium. Moreover, many farmers argued that climate change, pests and diseases lower their capacity to meet the FT requirements. To minimize the effect of climate change is difficult, however it could be of importance to educate farmers in how to change their production techniques to better adapt to a changing climate. Or find innovative ways to fight pests and diseases without the use of toxic chemicals. By creating effective policies that could lower the mentioned constraints, the percentage of FT certified coffee sold on the market is likely to increase. Besides the positive effects that will be given the farmers, improved performance of coffee could help Tanzania to reach the aim of Vision 2025 on poverty alleviation, empowered rural communities and economic development.

With the present limitations of the thesis in mind, suggestions to future research are presented here. Because many of the estimates risk suffering from simultaneous bias it would be of interest to identify an instrumental variable that could correct for these biases. Further, the result reveals that the farmers' perception about the availability of finances has a negative effect on performance. There is however likely other variables that affects the farmers perception about the availability of finances, for instance interest rates. It is a suggestion for future research to control for this.

9 References

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10 Appendix

10.1 List of villages where interviews were conducted

Village	District
Rushe	Karagwe
Katembe	Karagwe
Rwambaizi	Karagwe
Kamagambo	Karagwe
Nyakagoyegoye	Karagwe
Chanika	Karagwe
Kigarama	Kyerwa
Makazi	Kyerwa
Kikukuru	Kyerwa
Kitwe	Kyerwa
Kamuli	Kyerwa
Nyaruzumbura	Kyerwa
Kaisho	Kyerwa
Rwabwere	Kyerwa
Karongo	Kyerwa
Rwanyango	Kyerwa
Chanya	Kyerwa

10.2 Questionnaire

Questionnaire for Interviews: 'Motives for adoption of fair trade certification' (Smallholder farmers)

Research Title: 'Motives for smallholder coffee farmers to adopt fair trade certification: A case study of Tanzania'

Form Number:

Date:

Interviewers name:

Time (start) _____

(finish) _____

Important Notice

Dear Participant!

Thank you for agreeing to take part in this survey on smallholder farmer's motivations to adopt fair trade certification. The survey is being conducted for the purpose of a master thesis in Environmental Economics carried out at the Swedish University of Agricultural Science (SLU) in collaboration with Kaderes Peasant Development Plc (KPD). Your information is important for the development of local organizations working for empowering the community of Karagwe and Kyerwa Districts.

The information in the questionnaire will be treated confidentially and will be used for scientific research purposes ONLY. The responses provided will not be linked to individual names or addresses.

The anonymous data file will be made available for other scientific research purposes. All information that might indirectly identify respondents or organizations will be eliminated from the data file before it is made available.

Publications based on the data will never contain information that can identify individual respondents or individual educational institutions.

If you have any inquiries, please feel free to contact Ms Filippa Pyk by email: filippapyk@gmail.com

1) Which age category are you in?

18-25 26-35 36-45 46-55 56-65 Over 65

2) What is your gender?

Female Male

3) How many years have you been working as a farmer?

Less than 5 years 5-10 years 10-15 years 15-20 years More than 20 years

4) For how many years have you been certified as a fair trade farmer?

Less than 5 years 5-10 years 10-15 years 15-20 years More than 20 years

5) Are you certified as an organic farmer?

Yes No

6) If yes on question 5), how many years have you been certified organic?

Less than 5 years 5-10 years 10-15 years 15-20 years More than 20 years

7) Can you please circle the size of your family? (Number of family members)

1-3 people 4-7 people More than 7 people

8) How would you consider your writing and reading skills?

Very bad Bad Moderate Very good

9) Which level of education have you achieved?

Primary Secondary High school Collage University Other

If other, please specify
.....

10) Do you use the intercrop agriculture method?

Yes No

11) Which crops do you grow and what is the approximate area devoted to that crop?

Crop	Mark	Area (in acre)	Annual income from this crop (in Shilling)
Coffee			
Green bananas			
Maize			
Beans			
Cassava			
Tea			
Others			

26) Estimation of cost - Coffee

Expenses	Annual cost per acre	Acre	Total
Digging hole			
Planting			
Fertilizer			
Weeding			
Mulching			
Pruning			
Harvesting			
Sheeting			
Labour drying			
Sorting			
Empty bags			
Other			

12) How many people work on your farm?

1-3 people

4-7 people

More than 7 people

13) Can you please circle the total size of your farm?

0-1 acre

1-2 acre

2-3 acre

3-4 acre

4-5 acre

More than 5 acre

14) Can you please circle the total size of your farm that is certified as fair trade?

0-1 acre

1-2 acre

2-3 acre

3-4 acre

4-5 acre

More than 5 acre

15) How would you evaluate your fair trade revenue in the last three years?

Very low

Low

Moderate

Very high

Don't know

16) Please fill in how strongly you agree with the statements below

I adopted fair trade certification because ...	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't know
... That would increase the price of my coffee					
... That would increase my coffee yield					
... Fair trade farming has lower production costs than conventional farming					
... That would enable me to meet foreign demand for coffee					
... That would make me less vulnerable for price changes in the domestic market for coffee					
... I wanted to increase the quality of my coffee					
... I expected that finding coffee buyers is much easier when I am certified					
... I worried about the changing rain seasons in the area and Fair Trade production standard would reduce climate impact in the Kagera region					
... I worried about climate change in general					
... Fair trade would increase the fertility of my soil					
... I worried that pesticides and/or fertilizers are contaminating water resources					
... I worried about the effects pesticides and/or fertilizer have on me and my family's health					
... I worried about the effects pesticides and/or fertilizer have on local wildlife					
... I wanted to supply safer and higher quality coffee					
... I felt good about myself by not using harmful farming techniques					
... A certification would attract skilled labor to my farm					
... The adoption of the certification enabled me to become a member of Kaderes Plc					
... Other farmers in my area were certified and therefore I also wanted the certification					
Other, please specify:					

Extra

... I wanted to strengthen the local community					
--	--	--	--	--	--

17) Which institutions do you think are the most important for the agriculture business?

Institution	Not important	Important	Moderate	Very important	Don't know
Non governmental organizations (NGO)					

Tanzania Marketing Coffee Board					
District councils					
Ministry of Agriculture Food Security and Cooperatives					
Other Please specify:					
Other Please specify:					

18) Please fill in how strongly you agree with the statements below

My expectations of the membership in Kaderes Plc was that...	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't know
...They could effectively provide me with a certification					
... They could provide me with an affordable certification					
... They could provide me with useful knowledge in sustainable farming					
... They could help me with marketing information					
... The membership would enable credit for investment					
... The organization could provide me with information about the global demand for coffee					
... The organization could help myself and buyers to connect with each other					
... It would open up the possibility for me to export some proportion of my yield					
... I could participate in the creation of mandatory national standards					
Other Please specify:					

19) Do you think that the requirements in place for fair trade are fulfilled?

Fulfilled To some extent Not fulfilled No opinion

20) How adequate do you consider your own capacity for meeting the fair trade standard requirements?

Totally adequate Partly adequate Not adequate at all
No opinion

21) How does your capacity to meet the fair trade requirements compare to that of other fair trade farmers in the area?

More capable Same capability Less capable No opinion

22) Could you please fill in the constraints that you face in order to meet the fair trade requirements?

Constraints	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
Lack of availability of skilled labor					
Lack of infrastructure					
Lack of financial support					
Lack of extension services, such as training and education in the fair trade agriculture business					
Lack of governmental support					
Other, please specify:					
Other, please specify:					

23) If you faced challenges with the fair trade requirements, how would you respond?

Comply Stop Challenge the requirements Other
 If other, please specify

.....

24) What are the benefits achieved due to involvement in fair trade certification?

Benefits	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
I have gained higher prices for my coffee					
I have increased my coffee yield					
My production costs have decreased					
I have become less vulnerable to price changes in the domestic coffee market					
I can see environmental progress in my local area					
My soil has become more fertile					
Water resources are less polluted					
I and my workers have better health					
The local wildlife is more healthy					
I am feeling good about myself that I use sustainable farming techniques					
I have gained access to financial support					
I have gained knowledge due to training and education in fair trade production					
Other, please specify:					
Other, please specify:					

Extra

... Local community have been strengten					
---	--	--	--	--	--

25) What prevents you from investing more in fair trade production?

Reason	Strongly agree	Agree	Disagree	Strongly disagree	Don't know
Lack of governmental support					
Limited access to capital and financial incentives to invest					
Inability to commercialize and realize return on investment					
The long time to realize return on investment					
Size of my farm					
Lack of knowledge in fair trade production					
Shortage of skilled labor					
Inability to predict yield due to climate change					
Other, please specify:					
Other, please specify:					

Thank you for taking your time!
Best,

10.3 Collinearity table

Variab les	Exp. p.	Exp p. FT	Pl ot siz e	Nr. work ers	Edu c.	NG O	TMC B	Dist. C	Minist ry	Capaci ty	Labo ur	Finan ce	Educ&E xt.	Gover n. suppo rt	Clima te chang e
Exp.	1														
Exp. FT	.09	1													
Plot size	.25	.02	1												
Nr. workers	.16	0	.15	1											
Educ.	0	-.02	.05	.03	1										
NGO	-.07	-.14	.14	.12	-.05	1									
TMCB	-.08	-.02	-.07	-.14	-.07	-.08	1								
Dist.C	-.03	0	.01	.11	.14	.05	.22	1							
Ministry	-.24	-.07	.02	.09	.15	-.05	.12	.35	1						
Capacity	-.1	.13	-.12	.09	-.03	.07	-.03	.05	-.02	1					
Labour	0	-.11	.02	.19	.15	.08	-.11	.09	0	-.09	1				
Finance	0	-.01	.02	-.06	.01	.23	-.05	-.06	-.15	-.05	.24	1			
Educ&e xt.	.19	.01	.05	-.03	0	-.2	.12	-.11	.02	-.22	.03	0	1		
Govern. Support	.17	.05	0	.03	.04	.23	-.1	.03	-.17	-.08	.27	.17	-.01	1	
Climate change	-.12	.02	-.06	-.17	.1	-.1	.02	-.05	.01	-.13	-.11	-.06	-.02	-.1	1

10.4 Correlation productivity – independent variables

Experience	Coef.
Productivity	-0.2017*** (0.0069)

Source: Author's calculations based on OLS model results

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

Access to education and extension service	Coef.
Productivity	-0.0235** (0.0102)

Source: Author's calculations based on OLS model results

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

Access to financial support	Coef.
Productivity	-0.0137** (0.006)

Source: Author's calculations based on OLS model results

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