



Linking smallholder farmers to markets on extensive and intensive margins: Evidence from Nicaragua☆



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ABSTRACT

Access to modern commercialization channels is key for smallholder farmers to move away from subsistence farming and overcome poverty. However, achieving that goal is challenging for smallholders given their lack of appropriate managerial practices, production technology and infrastructure. This paper examines the association between receiving trainings in two distinct entrepreneurial practices, one direct at the individual and farmer-association level and another indirect at the community level, and commercialization in non-local markets at the extensive and intensive margins. We exploit a panel dataset of bean producers in Nicaragua that participated in an NGO program implemented between 2007 and 2012. We find opposite results for the two market-linkage activities, especially on the intensive margin or volume of sales. While receiving direct training on entrepreneurial practices (EP) is positively associated with commercialization, training on municipality engagement (ME) activities is negatively associated. These correlation patterns are mainly observed among entrant farmers as opposed to those already participating in commercial markets prior to the program implementation. We also find varying results for ME activities by plot size and leadership position. Additional estimations show that training activities that are positively correlated with bean commercialization are not necessarily correlated with the commercialization of other crops, and vice versa.

1. Introduction

The importance of product commercialization by small producers to alleviate rural poverty in developing countries is well established in the literature (Barrett et al., 2010; Collier and Dercon, 2014; Dethier and Effenberger, 2012). In particular, the potential of accessing modern market channels to reduce poverty has received considerable attention in recent years. While the inclusion to marketing channels through retail companies tends to be limited to those with specific endowments such as storage facilities (Farina and Reardon, 2000), irrigation systems and favorable locations (Michelson et al., 2012), participation in integrated supply chains can be beneficial for small agricultural producers. For instance, global supply chains offer premium product prices (Gulati et al., 2007) whereas vertical integration reduces market search costs (Vieira, 2008). Provision of inputs such as fertilizer increases agricultural productivity (Minten et al., 2009).

Still, commercialization by small agricultural producers is often hindered by high transaction costs. In many developing regions, small producers lack appropriate managerial capacity, production technology and infrastructure, which prevent them from commercializing. When

marketing transaction costs are high, farming households do not gain from product specialization or trade (de Janvry et al., 1991; Omamo, 1998). In general, only a small fraction of farmers in rural areas manage to commercialize while others remain in the semi-subsistence system (Barrett et al., 2012). This semi-subsistence production system is usually characterized with low productivity and little to no update of production technology (Balat et al., 2009; Barrett et al., 2012; Bellemare and Barrett, 2006).

Heterogeneity among agricultural producers is crucial in understanding current and potential access to modern commercialization channels. One characteristic of small producers that participate in integrated markets is the adoption of improved production and processing technology, although the direction of causality is not clear (Gulati et al., 2007; Narayanan and Gulati, 2002). Another correlated feature is access to irrigation: farmers participating in supermarket supply chains are found to be equipped with irrigation more often than non-participants (Berdegué et al., 2005; Hernández et al., 2007). Geographic location and improved transportation infrastructure also seem to play a major role in the integration of small farmers into global supply chains (Michelson, 2013; Neven et al., 2009). Examples of vertically integrated

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supply chains show that such production and marketing assets are provided to suppliers by retail companies (Reardon et al., 2009; Swinnen, 2007).

Efforts to link smallholder farmers to commercial markets involves multiple levels of policy interventions (Barrett, 2008; Barrett and Swallow, 2006). Depending solely on private initiatives may result in further marginalization of the poor (Jaffee et al., 2011; Whitfield, 2012). In this context, interventions through development organizations can be an effective tool for policy makers to assist smallholder market participation. Development agencies- and non-governmental organizations (NGO)-based interventions can benefit small agricultural producers by providing services necessary for commercialization such as production technology upgrades, stakeholder communication, provision of inputs and credit, access to market information, and value chain development (Carletto et al., 2011; Dethier and Effenberger, 2012; Humphrey, 2009).

Recognizing the potential of interventions that promote market linkages, a number of donor agencies have launched several projects to develop integrated pro-poor supply chains (Bignebat and Vagneron, 2011; FAO, n.d.; Humphrey, 2009; IFAD, 2012; Stoian et al., 2012). However, the efforts to link smallholders to commercial markets through development projects is still relatively new (Jaffee et al., 2011) and have not been fully studied (Barrett, 2008; Humphrey and Navas-Alemán, 2010; Mithofer, 2011; Stoian et al., 2012). This may be due to identification problems (Carter et al., 2016) or challenges in acquiring household-level panel data (Bardhan and Mookherjee, 2011). While NGO-based interventions are seen effective in smallholder commercialization (Ashraf et al., 2009; Carletto et al., 2011; Kersting and Wollni, 2012), the empirical literature fails to investigate what interventions are useful for particular aspects of market linkage and for what crops.

This paper contributes to fill this gap by examining the correlation between receiving two distinct interventions implemented by Catholic Relief Services (CRS), an NGO operating in Nicaragua, and access to commercial markets. We use a detailed panel dataset of smallholder producers that participated in the NGO program implemented between 2007 and 2012. One of the interventions focused on developing entrepreneurial capacities to encourage commercialization at the individual and farmer-association level and the other focused on community-level cooperation. The panel nature of our data permits us to exploit variations in participation on market-linkage (ML) activities across farmers and over time, while controlling for unobserved individual heterogeneity.

We focus on bean producers and extend the analysis to coffee producers for comparison purposes. Both beans and coffee are important sources of food, employment and income for Nicaraguan smallholders (FAO, 2012; INIDE, 2011; Villanueva et al., 2006). Beans are among the three most important food commodities in the country while coffee is the main crop exported (in terms of production area). Staple crops such as beans, however, provide less incentive for farmers to commercialize than high-value crops such as coffee. This is because there is little product differentiation that fetches premium prices (Berdegué, 2002; Hellin et al., 2009). Still, commercialization of staple crops is necessary in order to facilitate shifts away from a semi-subsistence system to market-based production of high value commodities (Barrett, 2008).

The literature shows that differences in terms of individual and production characteristics are crucial in commercial marketing. In this line, we also investigate whether the estimated correlation patterns between NGO-based capacity building activities and bean sales differ across farmers with varying characteristics. We test the following hypotheses. First, we evaluate whether there is a positive correlation between receiving NGO support on market linkage and commercialization at the extensive margin (i.e. likelihood of commercialization) and intensive margin (i.e. volume of commercialization). Second, we segment the sample into farmers that were already commercializing part of their production in non-local markets prior to the program interventions and farmers that were only selling in local markets before the program

started to see if the correlations differ across these two groups. Third, we assess if there are differentiated results by gender, plot size and leadership position.

We find opposite results for the two types of ML interventions studied. Developing entrepreneurial capacities at the individual and farm-association level is positively associated with the commercialization of beans in non-local markets while focusing on community-level cooperation is negatively associated, particularly on the intensive margin. These correlations are mainly observed among entrant farmers and we further find varying results by plot size and leadership position. In the case of coffee producers, in contrast, receiving training on ML activities is not correlated with accessing commercial markets as opposed to environment-related activities. These findings suggest that similar interventions could have different intended results depending on the way they are delivered (i.e. individual/group focus versus community approach) and on the type of farmers (crops). This is critical to take into account when designing rural development projects that intend to successfully and sustainably connect smallholder farmers to markets.

The rest of the article is organized as follows. Section 2 provides an overview of the NGO project and the market-linkage interventions to be evaluated. Section 3 describes the data and empirical model. Section 4 presents and discusses the estimation results. Section 5 summarizes and concludes.

2. Overview of the NGO project and the market-linkage program

CRS implemented a series of extension programs between 2007 and 2012 to help smallholder farmers located in over 1000 villages across 12 departments in Nicaragua. The target group was mainly small agricultural producers, most of them already members of a farmer association and with potential to improve their production and commercialization capacity.

The training programs were selected and designed by CRS and the local cooperatives (associations) that most project participants belonged to. CRS, the farmer associations and two other NGOs operating in Nicaragua were also involved in the implementation of the programs. There were no restrictions on the number of activities that a farmer could participate in over the period of the project. There was little flexibility though for farmers to sporadically enroll into specific training activities as participation was decided at the farmer association level and participants were chosen at the beginning of the intervention phase (i.e. before the program started in a particular year). We focus on bean producers as this is a major staple crop in Nicaragua, generally produced by smallholders across the country. Fig. 1 shows the bean production areas targeted by the project. We also focus on ML interventions as these were given particular attention by the project among bean producers.

The ML training activities can be divided into two types: entrepreneurial practices (EP) and municipality engagement (ME). These activities were designed following the guidelines developed by the International Center for Tropical Agriculture (CIAT, 2012) and the Tropical Agricultural Research and Higher Education Center-CATIE (Donovan and Stoian, 2012). While the ME intervention focuses on community-level cooperation to encourage commercialization, EP activities involve direct interventions that develop individual farmers and cooperatives as credible business enterprises, i.e. promote business social responsibility (CRS, 2010).

In particular, EP activities included workshops and knowledge exchange activities on organization structure, book keeping, building strategic plans, commercialization strategies, developing value chains, vision of cooperatives as business enterprises, and participation in business meetings with potential buyers. ME activities focused on community meetings and communication and negotiation with local municipal governments in order to cooperate in developing value chains, including an adequate legal structure and other supporting mechanisms for smallholder farmers and promoting infrastructure

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