Collective Action in Agriculture: The Case of Wine-grape Farmer Cooperatives in Chile

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Introduction

Farmers in Chile are not organizing and reaping the potential benefits of collective action, such as access to high-value markets and increased competition. These could help them (especially small-holders) increase the price they receive for their produce. I plan to investigate this issue in the wine-grape market in Chile.

In the past decades there has been a change in consumer preferences in the world towards high-quality products. This has posed challenges but also opportunities for small-holder and less educated farmers (SFs) in developing countries (Reardon and Barrett, 2000; Reardon and Berdegué, 2002; Anderson, 2004). However, there are barriers that restrict SFs' participation in these markets such as access to credit, education, and the scale of production. Contract farming and cooperatives are possible ways of integrating these farmers into high-value markets (Reardon and Barrett, 2000; Hellin et al., 2009; Torero et al., 2010). In fact, contract farming and cooperatives have expanded in the world in the past decades (Reardon and Barrett, 2000). In terms of wine-grape contracting, Chile is no exception. In a random sample of 184 wine-grape farmers, most farmers have either explicit or implicit contracts with their buyers to sell their wine grape. However, Chile is an exception in terms of the incidence of wine-grape farmer cooperatives. For example, in Chile there are a total of 5 active wine-grape cooperatives (Ministerio de Economía, 2014). In my data, I observe 17% of farmers participating in 2 of these cooperatives and in a couple of farmer associations that are not cooperatives (henceforth, I use the term "cooperatives" to refer to both cooperative and non-cooperative associations).[1] So, why aren't most SFs organized in wine-grape cooperatives in Chile, as they usually are in the rest of the world?

Some potential explanations are, first, that the historical and institutional setting in Chile inhibited cooperative formation. Second, that trust among farmers is insufficient to form cooperatives, for example, farmers may fear that because of the free-rider problem some will benefit out of the "contributions" of the rest of the members. Finally, that cooperatives exist only where transaction costs are sufficiently high so that cooperatives help to fill market gaps. In this paper I will focus on this last hypothesis (hereafter, the "transaction cost" hypothesis).

There has been some work exploring the historical and current state of farmer associations in Chile from which I will draw some of the historical and institutional evidence that will serve as background information (Berdegué, 2001; Pérez et al., 2003; Nayan et al., 2012).

In an environment with high-transaction costs including, for example, high costs of transportation, scattered markets, and high risks associated with the marketing of perishable products, we would expect farmer associations to fill market gaps (Holloway et al., 2000). Although the wine-grape sector seems to have all of these characteristics, cooperatives have not developed as in other places. I plan to explore why this is occurring considering a theoretical perspective based on the theory of collective action and cooperative formation, and an empirical perspective that

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[1]For comparison purposes, in Perú there are approximately 78 coffee-farmer associations and 22 cocoa-farmer associations. The latter export about 70% of the total volume of cocoa beans. In Argentina, agricultural cooperatives contribute to about 6% of GDP and wine cooperatives have a market share of about 13%. In Chile, wine-farmer associations export about 0.2% volume of total bottled wine and 1% volume of total bulk wine exported (Confederación Cooperativa de la República Argentina, 2006; De la Cerda, 2011; Mogrovejo et al., 2012).

investigates the determinants of participation in wine-grape cooperatives.

Theoretical Framework

From a theoretical perspective, the theory of collective action has usually been applied to the problem of common pool resources, where it is hard to exclude individuals from resource consumption (Ostrom, 1990).[2] While a cooperative has elements of a public good since it provides goods and services to its members that are non-rivalrous, it can exclude members at formation. The public good component of cooperatives may generate free-riding of members, especially at the time of cooperative formation.

Sociologists have proposed that a critical mass is needed for collective action (Marwell and Oliver, 1993), which could be reinterpreted as the need of a minimum number of members to cover initial costs of cooperative formation (Hueth and Moschini, 2014). This, combined with the problem of free riding, may prevent cooperative formation in the absence of exogenous policies encouraging it.

Cooperative formation has usually been studied in economics from an industrial organization perspective including imperfect competition and cooperatives' potential pro-competitive effect but almost no work has been undertaken to explicitly link collective action and cooperative formation (Sexton and Sexton, 1987; Hueth and Moschini, 2014). Hueth and Moschini are recently attempting to do this for the case of cooperative formation in the United States. In fact, they develop a model of endogenous cooperative formation to solve collective action problems. In cases where a profit-maximizing firm chooses not to enter a market, they show that the cooperative enterprise may endogenously arise as an efficient response to provide goods and services. However, cooperative formation is widespread in the United States.

The interesting aspect of focusing on Chile is that certain conditions, which I will attempt to investigate in this project, have prevented widespread cooperative formation. Further, applying it to an agricultural context is relevant given that farmer associations provide a way to overcome liquidity constraints, information asymmetries, minimum efficient production scales, and/or marketing (Reardon and Barrett, 2000).

I will elaborate a theoretical model based on the theory of collective action and cooperative formation that incorporates transaction costs. The connection between collective action and cooperative formation has scarcely been studied (Hueth and Moschini, 2014) as well as their connection with transaction costs. This model will provide predictions that will guide the empirical estimation.

I will base my model on work that is currently being conducted by Hueth and Moschini (2014) and adapt it to the Chilean wine-grape context. Hueth and Moschini develop a model of endogenous cooperative formation to solve collective action problems. In cases where a profit-maximizing firm chooses not to enter a market, they show that the cooperative enterprise may endogenously arise as an efficient response to provide goods and services or, in other words, to fill the missing-markets' gap.

Cooperatives have elements of a public good and there are incentives to free ride, especially at the time of cooperative formation. Indeed, for a cooperative to be formed, consumers (or future

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[2]Common pool resources are non-excludable (cannot exclude agents from consumption of a good) but they are rivalrous, meaning that an agent's consumption of a unit of a good eliminates any benefits that other agents might have derived from that unit (Cornes, 1996), while pure public goods are non-rival and non-excludable.

members) need to cover initial fixed costs. So, there is a minimum number of consumers needed to put capital to cover those costs. Nevertheless, once the cooperative is created members cannot be excluded from accessing the cooperative's goods or services. So, there is an incentive for potential members to wait until other agents cover the initial fixed costs and then join the cooperative, delaying or impeding cooperative formation. However, if there is sufficient demand for these goods or services—assumed to be privately known to consumers, cooperatives may be created to fill the missing-markets' gap. For example, in the case of wine-grape cooperatives, if there is no market available, or located sufficiently close, for farmers to sell their wine-grapes, farmers themselves may invest in forming a cooperative that buys wine-grapes and, possibly, makes and markets wine. I will incorporate these ideas in the model.

Data and Methods

To study cooperative formation empirically, one would need data before and after formation, and formation is usually difficult to predict (unless it is exogenously encouraged through, for example, specific policies). Therefore, I do not propose to study cooperative formation empirically *per se* but instead, I will study the determinants of participation in farmer associations at one point in time, given the cross-sectional nature of my data. This is close in spirit to the analysis conducted by Holloway et al. (2000). These authors explore the impact of household-level transaction costs and production techniques on participation in governmentally-created milk groups, through milk marketing. Their results indicate that transaction costs play an important role in participation. They conclude that milk groups can enhance participation of farmers by providing better market access. I believe that cooperatives may also provide market access for wine-farmers that are isolated. Their analysis is based on a regression of marketable surplus on transaction and other characteristics. I will instead estimate the determinants that affect the probability of being member in a wine-grape cooperative on transaction cost measures. I particularly care about indicators of the spatial nature of cooperatives that may affect transaction costs such as measures of isolation. Along those lines, Sexton (1990) (theoretically) studies cooperatives' pro-competitive effect and indicate the importance of the location of cooperatives relative to investor-owned firms.

As variables representing transaction costs, I will include regional characteristics such as measures of isolation and valley of production. If the transaction cost hypothesis holds, we would find that the more isolated farmers and the farmers with less market infrastructure are more likely to participate in farmer associations. I will measure isolation as distance from the main highway. Being far from the market increases the cost of transportation, so I expect to find a positive and significant coefficient on this variable. The valley of production may represent differences in transportation and market infrastructure between the two valleys considered in this project. Anecdotal evidence suggests that the Maule valley has poorer infrastructure. Assuming this is true, I would expect a positive and significant coefficient in the dummy variable for the Maule valley. Other controls that I will include in this regression are: education of the farmer, a measure of cultivation ability, measures of competition such as number of buyers, and indicators of the technology of production such as crop-management practices used in the previous season. I will estimate this regression using different techniques such as linear probability model and maximum likelihood estimation.

The data I will use for this analysis comes from a survey of 184 randomly-sampled wine-grape farmers located in two wine valleys of Chile, Colchagua and Maule, during a period of 5 months in the 2011-2012 season. These valleys were originally chosen because they are representative of

Chilean wine production including heterogeneous types of contracts. We collected data mainly on farmer and farm characteristics, characteristics of the vineyard and crop-management practices, characteristics of the current and past contracts, investments made throughout the history of the crop, and participation in wine-grape farmer associations.

Preliminary Results

Based on the empirical strategy outlined above, I conducted preliminary Probit and Logit regressions of the probability of participating in a wine-grape farmer cooperative on measures of isolation and the valley of production. As measures of isolation I considered distance to the main highway, number of alternative buyers, and having more than one buyer in the season. I controlled for characteristics of the farmer such as education, wealth, and crop-management practices. These preliminary results indicate that higher distance to the main highway increases the probability of participating in a wine-grape farmer cooperative and that the valley of production matters. Producing in Maule valley increases the chances of participating in a wine-grape farmer cooperative compared to Colchagua valley. The Maule valley is less developed in terms of marketing and physical infrastructure (e.g., higher percentage of unpaved roads) than the Colchagua valley. So, I find evidence in favor of the transaction cost hypothesis.

Potential Policy Implications

This study may highlight the need for institutional changes designed to promote farmer associations which can improve market access and pricing for the disadvantaged farmers.

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